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The Institute of British Foundrymen
The Institute of Vitreous Enamellers
The National Ironfounding Employers' Federation
The Welsh Engineers' and Founders' Association
and
The Foundry Trades' Equipment and Supplies Association

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The Manchester Conference

The Manchester Conference of the Institute of British Foundrymen, although perhaps not a record from an attendance point of view, was extremely well attended, and about 380 were present at the civic welcome. As the Lord Mayor is a patternmaker by trade, his speech was more of a homily on the difficulties of the foundry industry than a dissertation on the City of Manchester.

The presidential address of Mr. Roy Stubbs covered in a very practical manner the whole question of apprenticeship recruitment, and his advice that more attention should be paid to the provision of adequate labour than the creation of stocks of pig-iron and coke presented a new angle on an old problem. The importance which is attached to the buying department of most industrial establishments forms a striking contrast with the insignificance of the endeavour made to create an intelligent and reliable personnel. Unquestionably the announcement that the authorities of Sheffield University had decided to initiate this autumn a degree course in foundry practice will ameliorate the apprenticeship-recruitment problem in exactly the same way as stock exchanges help the materials-buying department.

The Papers, and the discussions which followed their presentation, were models to be emulated by other scientific societies, for in foundry circles it is no crime to be ignorant, and although a question could be readily answered by reference to a text-book and may be considered common knowledge by the scientists, the questioner is not snubbed. There is a real spirit of co-operation by a body of men who represent a true cross-section throughout the industry. At one meeting, attended by about twenty members, about one dozen contributed their quota to the discussion, and still the authors would welcome further discussion by correspondence.

The social side of the Conference was a model of organisation, and splendid provision was made for the entertainment of the guests. Mr. Stubbs was indeed fortunate in having Mr. J. E. Cooke and Mr. Norman Cook as his principal *aides-de-camp*, whilst full advantage was taken of Mr. Makemson's profound experience of organising conventions.

The works visits were sincerely appreciated, and it was pleasing to note that extensions and modernisations were being planned to already extremely efficient plants. To these organisations and their staffs the members are extremely indebted.

Steel Again

Mr. Walter Runciman made on June 8 an important speech in the House of Commons respecting iron and steel, and one which clearly shows the views of H.M. Government. It has been freely hinted from time to time that the Government was dissatisfied with progress on reorganisation and that the tariff might be reduced or even removed when the time came for revision. Mr. Runciman moved that approval be given to the 33⅓ per cent. duty on iron and steel without any time limit at all, so that steelmakers need not fear that by a fixed date the duty may be modified or withdrawn. Some of the facts of the situation outlined by him are familiar enough to our readers. The iron and steel industry absorbs about a sixteenth of our coal production. Due largely to foreign competition, the U.K. production of pig-iron was reduced between 1929 and 1932 by one-half, and the production of steel ingots and castings, and of finished-steel products, by nearly one-half. What was made was produced at highly unprofitable prices. The duty was originally imposed in April, 1932, for a period of three months, extended in July of that year for another three months, and then for two years to expire in October, 1934.

It is well known that much capital would be expended if there were reasonable certainty before the interests concerned, especially in the South Wales area. It is hoped that the new order will furnish the required stimulus. In the meantime, the reorganisation scheme is proceeding, and it is now understood that there shall be an independent chairman who is not a steel producer. Consumers will have the right of appeal to the Import Duties Advisory Committee if their interests are unduly hampered. There is little doubt that the iron and steel industry can look forward to something like stability and ordered development out of the chaos of conflicting interests which at one time were its chief characteristic.

XUM

Random Shots

The attractive feature of membership of the I.B.F. is the yearly conference. An anticipatory feeling, something akin to that which animates the young boy's breast as he sets off on his annual visit to the Zoo, fills the heart of your humble Marksman at the opportunity the yearly conference gives him of seeing all the foundry lions majestically promenading the arena. Here, year by year, Marksman lives a fuller life. For a brief spell he stints with the best of 'em, joins in the genial handshaking, sits, or stands, convivially in the jolly alcoholic reminiscences and even, at the zenith of his exuberance, trips the fantastic measure with some of the lionesses.

* * *

Too many Cooks may spoil the broth, but their conjoint effort produced a satisfying congress, as those who were tasting the sweets of office well know.

* * *

Conferences are very jolly, though everybody smokes far too much and too long, with the result that half the morning is taken up by all the men telling all the other men that this smoking during the very early hours certainly puts one out of sorts for the real work of the day. The real work of the day, of course, is attendance at the sessions of the Institute. Marksman always prefers the second day of the conference—the day on which two sessions are held simultaneously. When, during lunch, someone from Session A asks how he enjoyed the Papers, Marksman can always say that he was in Session B. This particular wangle has stood the strain very well so far at previous conferences. Naturally, if the questioner has been in Session B, then, of course, Marksman enjoyed himself hugely in Session A. Marksman, at the second-day lunch this year, however, recollected, only too vividly, the story of the pitcher that went to the well too often—he was sitting between speakers at both Sessions A and B, and finally had to admit that he had spent the morning with Miss Snookers.

* * *

The 1934 Conference was definitely sedate. The decor and appurtenances of the Midland Hotel are not perhaps conducive to that spirit of carefree abandon which has characterised some recent conferences. Many attending Manchester looked forward with pleasure, and not a little lip-licking, to the 1934 edition of the Geekayeffaitch Cabaret show, but alas for these, a deep depression fell and this marvellous outpouring of foundry art and wit blushed unseen and unheard. It was said, though Marksman cannot vouch for the truth of this rumour, that the spirit of the Cabaret did visit the conference in a semi-hysterical attempt to present the foundry version of the "Four Horsemen of the Apocalypse," arranged by Johnnie Walker after Bass, but the epic was hushed up and one horse was left in the arena with a broken leg and injured seat—the horseman, strange to say, being unhurt though unhorsed.

* * *

The *pièce de résistance* was undoubtedly the trip to Llangollen, with its voyage along a delightful canal in horse-drawn barges. In these days of Colmanesque records it was indeed delightful to proceed at a speed properly to be associated with 1 h.p., to the moaning wail of the Volga Boatman and the gentle rocking of those vulgar foundrymen, who take serious exception to obeying printed instructions. Normally Marksman has quite a good voice, but Normanly his efforts were completely ruined by one Cook. We were delighted to have with us—as presidents say—the ladies, but from Marksman's point of view, they do cramp his style, as he finds that the harvesting of the year's best stories is rendered somewhat more difficult.

Marksman would like to add his quota of congratulations to Mr. Harry Winterton. He undoubtedly deserved all the felicitations showered upon him. His support to these manifestations has been continuous and devoted for many years. Moreover, he has been ably and invariably seconded in these endeavours by his wife. He told Marksman that it was just twenty-five (or was it twenty-seven?) years ago that he first subscribed to the Great Kilometer Derby Sweepstake, and that when this year he drew Windsor Lad he really knew that at last he had achieved his life's ambition. Unfortunately he had miscalculated the amount of the stake money, having mixed up Irish Hospitals, Scotch whisky and kilometers, and had seriously mortgaged his winnings.

* * *

On the whole Manchester was a happy conference—the usual Manchester weather took a holiday, and the organisation was particularly well done. Nothing was left to chance—why, Marksman heard that the Editor of the JOURNAL, after receiving the Oliver Stubbs Medal, handed it over to the authorities for safe keeping during the conference (knowing the rest of the boys I don't blame him), and he had had to procure his passport and sign 18 forms, besides get half the Council to go surety for him, before he could regain it. Vale Manchester—Ave Sheffield.

MARKSMAN.

Correspondence

The Manchester Conference

To the Editor of THE FOUNDRY TRADE JOURNAL.

SIR,—The conclusion of the Annual Conference imposes a pleasurable duty upon your present correspondents, who beg a little space to express thanks to the numerous friends who have contributed to its success.

To the firms and companies whose premises have been open to inspection, to individuals who have rendered personal service, to all who have offered assistance in finance, entertainment, transport or publicity, grateful thanks are tendered.

The cordial co-operation and goodwill of our visitors and their ladies remain a happy memory to—Yours, etc.,

ROY STUBBS,
President of Conference.

J. E. COOKE,
Hon. Conference Secretary.

Readers' Queries

"Fettling" the Cupola

We have received the following inquiry from a subscriber. Can any of our readers supply the solution?

SIR,—I am wondering if any of your numerous jobbing-foundry readers could give me advice—founded on their own experience—in the following difficulty.

We have a "drop bottom" cupola, length of shaft, from charging door to base, 19 ft., with a diameter of 36 in., and, owing to this very restricted area, our furnaceman has a difficult and disagreeable job in "fettling" the cupola after every cast, or in carrying out any repairs. We find that it is not possible to insert an ordinary ladder, and we think possibly some of our foundry friends may make use of some contraption which might ease the situation and save the furnaceman's skin and clothing.—Yours, etc.,

C. F.

Glasgow,
June 8.

Meeting of American Foundrymen

Nearly two hundred interested visitors attended a foundry conference and district meeting of the American Foundrymen's Association held at the Ohio State University on April 5 and 6.

Prof. D. J. Demorest, Department of Metallurgy, discussed the economic aspects of fuels used in the foundry. A point developed in his talk was that a good coal may cost only a few cents more per ton to mine than one not quite so good, but the use in the blast furnace of coke made from the poorer coal may increase pig-iron costs 50 cents or more per ton.

Mr. C. Smith, of the Bonney-Floyd Company, Columbus, said Bonney-Floyd has been able, by suitable heat-treatment, to secure the following physical properties in medium-carbon cast steel: tensile strength, 36 to 56 tons/sq. in.; yield point, 24 to 45 tons/sq. in.; elongation, 30 to 8.5 per cent.; reduction area, 63 to 16 per cent.; Izod impact, 46 to 3 ft.-lbs.; Brinell, 167 to 253.

The talk on malleable cast iron by Dr. C. H. Lorig, Battelle Memorial Institute, was directed principally to the results of recent investigations of the effect of copper in malleable cast iron. The physical properties of malleable iron can be improved by copper additions of 1 per cent. or better. Further improvement in the physical properties of copper-bearing malleable iron can be achieved by a suitable heat-treatment which secures the so-called precipitation hardening effect.

Publications Received

Industrial Application of X-Ray Crystal Analysis. Issued by the Department of Scientific and Industrial Research, 1B, Old Queen Street, Westminster, S.W.1.

This pamphlet has been prepared with the object of providing industry with a clear statement of the services available at the National Physical Laboratory for the X-ray examination of engineering and other manufacturing products. Inquiries should be addressed to the Director, The National Physical Laboratory, Teddington, Middlesex.

Metal Statistics, 1934. Published by American Metal Market, 111, John Street, New York City. Price 2 dollars.

This handbook covers American prices for pig-iron, semi-finished and finished steel products, scrap, fuels, aluminium, antimony, copper, lead, nickel, silver, tin and zinc, together with an amazing mass of statistics relative to stocks, imports and production. It runs to a matter of 500 pages, and must be indispensible to business houses dealing in the international metal markets.

Catalogue Received

Steel Productions. Messrs. Edgar Allen & Company, Limited, Imperial Steel Works, Sheffield, 9, were well advised when they decided to publish "Your Guide to Edgar Allen Products." Here encompassed within 20 pages is a comprehensive list of an extremely wide range of metallurgical products so arranged that they are first compressed into one page and later expanded to the extent of the booklet. It represents an extremely intelligent attempt to interest potential buyers in a large number of products with a minimum of effort on the part of the reader. To accomplish this, resort has been made to the partial cutting of the edges of the pages to create an additional index.

INSTITUTE OF BRITISH FOUNDRYMEN

THIRTY-FIRST ANNUAL CONFERENCE AT MANCHESTER

The thirty-first Annual Conference of the Institute of British Foundrymen was held in Manchester from June 5 to 8, 1934, under the Presidency of Mr. Roy Stubbs (Manchester). The arrangements in connection with the conference were made by the Lancashire Branch and Mr. T. Makemson, the General Secretary of the Institute. The Chairman of the Conference Executive Committee was Mr. A. Phillips (immediate Past-President of the Branch), the other members being Mr. W. N. Cook (President of the Branch), Mr. R. A. Miles, Mr. Roy Stubbs and Mr. J. E. Cooke (Hon. Conference Secretary). The conference committees included a Ladies' Committee, of which Mrs. Roy Stubbs was Chairman, and there was an excellent programme for the entertainment of the ladies apart from the social functions in which both sexes joined, these latter including the annual banquet and dance, receptions and entertainments. The headquarters of the conference were at the Midland Hotel, Manchester.

In addition to the conducting of the formal business of the Institute and the meetings for the consideration of technical Papers, arrangements were made for visits to various large works in the Manchester district. The works visited by the members during the period of the conference were those of Messrs. Joseph Stubbs, Limited, at Openshaw (Foundries: textile machinery and general engineering castings); the Metropolitan-Vickers Electrical Company, Limited, Trafford Park (manufacturers of steam turbines, generators and all kinds of electrical plant, the works including the ironfoundry, where castings up to 60 tons are made, and the non-ferrous foundry); the Lancashire Steel Corporation, Irlam (blast furnaces, coke ovens, open-hearth steel plant, rolling mills and iron and steel foundry); Messrs. Tweedales & Smalley, Limited, Castleton, near Rochdale (textile machinery manufacturers, whose works include an ironfoundry); Messrs. Craven Bros., Limited, Reddish (makers of heavy machine tools, whose works include an ironfoundry, for castings up to 40 tons, and non-ferrous foundry), and Messrs. Leyland Motors, Limited, Leyland (builders of heavy motor vehicles, whose works include a steel foundry with electric furnaces and iron, non-ferrous and aluminium foundries).

On June 8, the last day of the conference, the members and their ladies enjoyed a visit by motor-coach to Llangollen, North Wales. After lunch at Llangollen they proceeded by barge along the canal to Berwyn, in the valley of the Dee, and later rejoined the motor-coaches and travelled to Chester for tea, returning to Manchester in the evening.

ANNUAL GENERAL MEETING

The Annual General Meeting of the Institute was held at the Midland Hotel on Tuesday evening, June 5. Mr. C. E. Williams, of Cardiff (Retiring President), was in the chair.

Greetings to Original Members

The CHAIRMAN, who said he had been reminded that he had attended the Institute's first meeting, said that some of the original members who were still living were unable by reason of age to attend the conference. It had been suggested by Mr. Primrose, therefore, that the greetings of the conference be sent to them, and the Chairman proposed that that be done. The resolution was seconded by Mr. J. S. G. Primrose, and carried. Mr. Primrose said he had derived great pleasure from corresponding with all the original members in order to obtain their photographs and signatures, which were contained in the conference souvenir booklet.

Minutes

The minutes of the preceding annual general meeting, held at Cardiff in June, 1933, were taken as read, and were confirmed and signed.

On the motion of the CHAIRMAN, seconded by MR. F. J. COOK (Past-President), the annual report of the General Council for the session 1933-34 was adopted, without discussion.

MR. ROY STUBBS

(President of the Institute of British Foundrymen).

MR. R. W. STUBBS was educated at the Victoria Park School, Manchester, and then at the Manchester Grammar School. He studied metallurgy, machinery, drawing and chemistry at the College of Technology, Manchester, and joined the firm of Messrs. Joseph Stubbs, Limited, where he spent many years in the foundry as a moulder and coremaker, etc. Mr. Stubbs served in the war as a gunner in the R.F.A., and at the end of the war returned to an executive position in the foundry of Messrs. Joseph Stubbs, Limited. Later he joined the board of directors and is now in charge of the foundry. He joined the Lancashire Branch in 1919 and was President in 1930 and 1931, and also is a member of the Manchester Association of Engineers. He is a member of the Executive Board of the National Ironfounding Employers' Federation, and of the Executive Committee of the Manchester and District Ironfounders' Employers' Association.

ANNUAL REPORT

This report covers the period of twelve months ended April 30, 1934, and the accounts are for the year ended December 31, 1933.

Membership

Experience shows that trade conditions are usually reflected in the membership of Institutes such as this, after a period of two or three years, and there is a slight decrease of membership due to the conditions of trade which prevailed during the years 1931 and 1932. A recent influx of new members encourages the hope that this decrease will be neutralised in the course of the present year.

Tables I and II show the changes of membership, and an analysis of the present membership.

TABLE I.—*Changes of Membership.*

	Subscribing firms.	Members.	Associate members.	Associates.	Total.
At April 30, 1933..	49	748	962	135	1,894
Losses and transfers to other grades	2	76	97	43	218
	47	672	865	92	1,676
Additions and transfers from other grades ..	3	72	69	12	156
At April 30, 1934.	50	744	934	104	1,832

Obituary

It is with regret that the Council reports the deaths of ten members during the year, including those of Mr. F. Allan, President of the Newcastle Branch in 1931-32, and Mr. Stanley G. Flagg, of Philadelphia, a Past-President of the American Foundrymen's Association and an honorary member of this Institute. Mr. R. R. McGowan, a former President of the Scottish Branch, also passed away during the year.

Finance

It is satisfactory to note that the finances of the Institute are in a prosperous condition. Subscriptions have increased by approximately £60, and due to economical working, there has been a decrease in expenditure. The year's working shows an excess of income over expenditure of over £60. The cash at the bank, £336 4s. 6d., includes the sum of £74 11s. 9d., which has been transferred from the surplus funds in the hands of the Branches.

Cardiff Conference

The Thirtieth Annual Conference was held in Cardiff from June 20 to 23, 1933.

TABLE II.—*Analysis of Membership, April 30, 1934.*

Branch.	Subscribing firms.		Members.		Associate members.		Associates.		Total.	
Birmingham	2	(1)	106	(102)	114	(125)	17	(20)	239	(248)
East Midlands	3	(4)	46	(46)	79	(93)	3	(4)	131	(147)
Lancashire	15	(13)	121	(114)	240	(238)	24	(23)	400	(388)
London	6	(5)	147	(149)	80	(79)	7	(10)	240	(243)
Middlesbrough			25	(30)	38	(36)	5	(5)	68	(71)
Newcastle	6	(7)	35	(44)	36	(41)	29	(54)	106	(146)
Scottish	6	(6)	87	(83)	173	(171)	10	(8)	276	(268)
Sheffield	6	(7)	84	(82)	70	(72)	7	(8)	167	(169)
Wales and Monmouth ..	2	(2)	26	(27)	33	(36)			61	(65)
West Riding of Yorkshire	3	(3)	35	(36)	60	(60)	1	(2)	99	(101)
Unattached..	1	(1)	32	(35)	11	(11)	1	(1)	45	(48)
	50	(49)	744	(748)	934	(962)	104	(135)	1,832	(1,894)

The figures in brackets are for the year ending April 30, 1933.

On Tuesday, June 20, ladies and members were entertained at a reception by the Lord Mayor and Lady Mayoress of Cardiff, and the Lord Mayor and other prominent citizens attended the opening meeting.

The authorities of the University College, Cardiff, also entertained the ladies and members at a reception.

At the Annual General Meeting, Mr. C. E. Williams was installed President in succession to Mr. Victor Stobie.

The Council tenders its sincere thanks to the Lord Mayor, Alderman C. F. Saunders, J.P., the Lady Mayoress, Miss Muriel Saunders, and Prof. J. F. Rees, of the University College of South Wales and Monmouthshire, for their hospitality, and to Mr. J. Morgan Rees, President of the South Wales Institute of Engineers, and his Council, for so kindly placing their building at the disposal of the Institute for their meetings.

The thanks of the Council are also given to those firms who arranged visits for members and ladies to their respective works, and to the staffs of those firms; to the authors of Papers, and to those who subscribed to the Conference Fund or in any way assisted in the organisation. Thanks are specially due to the Chairman of the Reception Committee, Mr. Wm. Williams, to Mr. J. J. McClelland, the Honorary Conference Secretary, and to his daughter, Mrs. Rawden.

Technical Committee

The activities of the Technical Committee and its Sub-Committees which have been referred to in previous reports, have continued with considerable vigour. Further details are given in the special report of this Committee which follows this report.

Invitations

Messrs. F. W. Bridges & Sons invited the Council to luncheon, and the whole of the members to tea, at the Shipping, Engineering and Machinery Exhibition held at Olympia, in September, 1933. A large number of members accepted these invitations and the Council's thanks are hereby tendered to Messrs. F. W. Bridges & Sons.

The Council also wishes to thank the Birmingham Chamber of Commerce for their invitation to luncheon at the British Industries Fair on February 27. The invitation was accepted by a number of members of the Council.

Educational Activities

Considerable progress has been made in the preliminary work in connection with the proposed Degree Course in Founding at the University of Sheffield. A Sub-Committee of the Institute has held a number of meetings, and is at present engaged in soliciting the necessary financial support from the industry. A considerable amount of financial assistance has already been promised.

The General Council has also accorded its support to the scheme brought forward by the British Cast Iron Research Association, for the establishment of a British Foundry School.

The examinations in Foundry Practice and in Patternmaking conducted by the City and Guilds of London Institute were held for the third time under the revised arrangements, in April and May, 1934. The results will be issued in due course. The results of the 1933 examinations show that there was a considerable increase in the number of candidates taking the examinations in Patternmaking. There was also a slight increase in the number of candidates for the examination in the subject of Foundry Practice and Science. The numbers presenting themselves for the 1933 examinations were as follow:—

	No. of Candidates.	Pass 1st Class.	Pass 2nd Class.
Patternmaking— Intermediate Grade	36	11	10
Patternmaking— Final Grade ..	10	2	2
Foundry Practice and Science	51	13	15

Prizes were awarded as follow:—

Patternmaking: Intermediate Grade.—Mr. B. R. Pearson, Technical College, Coventry; Bronze Medal.

Patternmaking: Final Grade.—Mr. J. G. Rees, Sheffield Foundry Trades Society; Silver Medal and Buchanan Medal of the Institute of British Foundrymen.

Foundry Practice and Science.—Mr. T. W. Trayherne, Birmingham; Bronze Medal and Buchanan Medal of the Institute of British Foundrymen. Mr. G. T. Hampton, County Technical College, Wednesbury; Bronze Medal.

Buchanan Book Prizes were also awarded to Mr. J. L. Handley and Mr. G. T. Hampton.

National Certificates.—Forty-six National Certificates in Mechanical Engineering were endorsed in respect to special Foundry subjects by the Institute of British Foundrymen, making a total of nine Higher and seventy-nine Ordinary Certificates since the inauguration of the special endorsement of these certificates three years ago.

Awards of the Institute

Oliver Stubbs Medal.—The twelfth award was made in June, 1933, to Mr. J. W. Gardom, "for his distinguished services as Convener of the Technical Committee during the past year."

Diplomas.—Diplomas were awarded at the Cardiff Conference in 1933, to five members for Papers given during the previous year. The names of the recipients and the Branches before which the Papers were given are as follow:—

W. West, Birmingham and Lancashire Branches.

H. E. Beardshaw, Lancashire Branch.

E. J. L. Howard, Lancashire Branch.

R. Ballantine, Scottish Branch.

C. A. Howe, Wales and Monmouth Branch.

The announcement of the Diploma awards for the Session 1933-34 will be made at the Annual General Meeting on June 5. (See page 377.)

Surtees Memorial Examination.—The 1934 examination was held by the Scottish Branch, and the successful candidates were:—

Andrew L. Mortimer—Gold Medal.

John M'Gregor—Silver Medal.

Overseas Foundry Associations

About twenty-five members and ladies attended the International Foundry Conference in Prague in September and afterwards made a tour of the industrial portions of Czecho-Slovakia.

A meeting of the International Committee of Foundry Technical Associations was held in Prague during the Conference period; the Institute was represented at this meeting by Messrs. J. Cameron, V. C. Faulkner and T. Makemson, who was present as Secretary of the Committee. Messrs. J. G. Pearce and T. Makemson were also present at the meeting of the International Cast Iron Testing Committee held during the same period.

The value of internationalism in foundry technique was recognised by President Masaryk, who honoured the Conference by receiving a small deputation of members of the International Committee. The Institute's international membership is indicated by the fact that no less than five members of the deputation of seven are members of the Institute, namely: Mr. J. Cameron, representing Great Britain; Mr. V. Delport, representing the United States; Prof. Pisek, Czecho-Slovakia; Mr. J. Leonard, Belgium; and Mr. T. Makemson.

The official exchange Paper to the International Conference at Prague was prepared by Mr. C. H. Kain. Mr. W. Y. Buchanan was the author of the Paper to the Polish Foundry Conference in June, and Mr. W. West prepared the Paper which was submitted on behalf of the Institute to the French Foundry Conference in November.

Exchange Papers will be presented on behalf of the Institute at forthcoming Conferences by the following members:—

International Conference, Philadelphia.—Dr. W. H. Hatfield.

French Foundry Conference, Nancy.—Mr. E. Longden.

Exchange Papers will be presented to our own Conference at Manchester in June next on behalf of the American, French and German Associations.

Branch Activities

The Institute has always recognised the value of the work of the Branches, and there is probably no other similar technical body which holds meetings in so many centres and whose Branches take so active a part in the conduct of the Institute's affairs. During the past year, meetings have been held regularly in about twenty cities and towns in various parts of the country and no less than one hundred and thirty Papers have been presented. Additionally, there have been several general discussions and the Presidential Addresses of the Branch-Presidents.

The General Council wishes to thank all these authors and the firms with whom they are associated for placing their experience at the disposal of the Institute and the industry in general. The Council also wishes to express its appreciation of the work of the Branch-Presidents and Secretaries and all who have assisted in the very large amount of detail work necessary in the organisation of the various Branches.

Employment Bureau

The Council is indebted to the proprietors of THE FOUNDRY TRADE JOURNAL for the continuance of the facilities which they have given for some years, whereby members of the Institute who desire employment are permitted to use the advertising columns of the JOURNAL free of charge. A considerable number of suitable positions have been filled as a result of these facilities.

British Cast Iron Research Association

Although the financial year of the British Cast Iron Research Association does not close until June 30, there is every prospect that the income and activity for the year will constitute a record and the contacts with the Institute have been fully maintained.

During the year the Association has brought forward an important proposal for the creation of a foundry high school which shall provide instruction of the highest order for those already engaged in the industry, and also to make Great Britain in this respect at least as well off as other countries, notably France and Germany.

Bye-Laws and Rules

The revised by-laws were approved by the Annual General Meeting in June last, and have been submitted to the Privy Council. The certificate of the Privy Council has not yet been given and in the meantime it is necessary to work to the existing by-laws.

General Council

Four General Council meetings and a large number of Committee meetings have been held at Cardiff, York, Birmingham and Derby. The average attendance at the General Council meetings was 45.

There have been eight meetings of the Technical Committee and Technical Council, and a large number of sub-committee meetings have been held. Additionally, there have been meetings of the Advisory Committees in connection with the City and Guilds of London Institute examinations, and the proposed Degree Course at the University of Sheffield.

Of the ten members of the General Council elected by ballot of the whole of the members, five retire each year; the five who so retire at the Annual General Meeting on June 5 are:—Mr. A. Campion, Mr. F. J. Hemming, Mr. B. Hird, Mr. J. R. Hyde and Mr. J. M. Primrose. All these gentlemen offer themselves for re-election.

The Council wishes to tender its very grateful thanks to Mr. W. B. Lake, J.P., Honorary Treasurer, whose interest on behalf of the Institute's finances has been invaluable.

Manchester Conference

The Thirty-first Annual Conference will be held at Manchester from June 5 to 8, when Mr. Roy Stubbs, President-elect, will be installed President of the Institute.

The report is signed by Mr. C. E. Williams, President; Mr. Tom Makemson, General Secretary.

BALANCE SHEET, DECEMBER 31, 1933.

LIABILITIES.

	£ s. d.	£ s. d.
Subscriptions paid in advance		97 2 6
Sundry creditors		429 9 9
The Oliver Stubbs Medal Fund :—		
Balance from last Account	209 9 2	
Interest to date	7 14 0	
Income Tax Refund ..	2 11 4	
	219 14 6	
Less Cost of Medal ..	9 0 0	
		210 14 6
The Buchanan Medal Fund :—		
Balance from last Account	120 18 10	
Interest to date	4 14 3	
		125 13 1
Sheffield University Fund ..		45 8 0
International Conference Fund :—		
Surplus included in General Investments		40 18 11
Accumulated Fund :—		
Balance at December 31, 1932	1,428 4 8	
Add : Excess of Income over Expenditure for the year ended December, 31, 1933	60 13 3	
		1,488 17 11
		£2,438 4 8

ASSETS.

	£ s. d.	£ s. d.
Cash in hands of Secretaries :—		
Lancashire	1 13 11	
Birmingham	28 12 10	
Scottish	14 0 2	
Sheffield	31 10 10	
London	23 17 6	
East Midlands	21 10 0	
West Riding of Yorkshire	13 11 3	
Wales and Monmouth ..	4 9 9	
Middlesbrough	3 11 6	
		142 17 9
Sundry Debtors :—		
Subscriptions due and subsequently received ..		99 4 6
Due from Sheffield Council		3 17 6
Lloyds Bank Ltd.		336 4 7
Do. (Sheffield University Fund)		45 8 0
The Oliver Stubbs Medal Fund :—		
£342 5s. 7d. Local Loans £3 per cent. Stock at Cost	200 0 0	
Balance at Lloyds Bank Ltd.	10 14 6	
		210 14 6
The Buchanan Medal Fund :—		
£125, £3 10s. per cent. Conversion Stock at 78½ ..	98 6 9	
Balance at Midland Bank	27 6 4	
		125 13 1
Investments Account :—		
£650, 3½ per cent. War Loan at cost	630 8 4	
£300, 5 per cent. Conversion Stock, 1944/64 at cost	297 14 11	
£653 19s. Local Loans 3 per cent. Stock at cost ..	451 13 8	
		1,379 16 11
Furniture, Fittings and Fixtures :—		
Per last Account	104 17 7	
Less : Depreciation 10 per cent.	10 9 9	
		94 7 10
		£2,438 4 8

W. B. LAKE, *Hon. Treasurer.*
TOM MAKEMSON, *General Sec.*

We have prepared and audited the above Balance Sheet with the Books and Vouchers of the Institute and certify the same to be in accordance therewith.

J. & A. W. SULLY & Co., *Chartered Accountants, Auditors.*
19–21, Queen Victoria Street,
London, E.C.4.
April 5, 1934.

INCOME AND EXPENDITURE ACCOUNT FOR THE YEAR ENDED DECEMBER 31, 1933.

EXPENDITURE.

	£ s. d.	£ s. d.
Postages		111 11 2
Printing and Stationery including printing of "Proceedings"		664 17 10
Council Finance and Annual Meetings Expenses ..		122 7 11
Medal for Past-President ..		3 0 0
Branch Expenses :—		
Lancashire	146 11 1	
Birmingham	73 17 4	
Scottish	99 15 4	
Sheffield	56 19 2	
London	59 2 10	
East Midlands	44 18 7	
Newcastle	42 1 0	
West Riding of Yorkshire	25 8 9	
Wales and Monmouth ..	30 15 3	
Middlesbrough	32 19 3	
		612 8 7
Audit Fee and Accountancy Charges		12 12 0
Incidental Expenses		75 15 3
Loss on Sale of Badges ..		0 3 4
Salaries—Secretary and Clerks		669 12 5
Rent, Rates, &c., of Office, *less* Received		91 5 0
Subscription International Committee		5 0 0
Depreciation of Furniture ..		10 9 9
		2,379 3 3
Excess of Income over Expenditure carried to Balance Sheet		60 13 3
		£2,439 16 6

MR. J. E. HURST

(Senior Vice-President of the Institute of British Foundrymen).

MR. J. E. HURST is the Technical Director of Messrs. Sheepbridge Stokes Centrifugal Castings Company, Limited, and also Technical Director of Messrs. Bradley & Foster, Limited, Darlaston. He has been intimately associated with the development of the centrifugal casting process in Great Britain, particularly in its application to special cast irons for high-duty purposes, and was manager of the centrifugal casting department of Messrs. Newton Chambers & Company, Limited, which has now been merged into the organisation with which he is at present connected. Formerly he was assistant chemist to Messrs. Beyer, Peacock & Company, Limited, Locomotive Works, Gorton, Manchester. He became successively chief chemist and metallurgist to Messrs. Richard Hornsby & Sons, Limited, of Grantham and Stockport, makers of gas and oil engines, and chief chemist and metallurgist to Messrs. D. Napier & Sons, Limited, Acton, London, during the war engaged in the manufacture of aeroplanes and aeroplane engines. Subsequently he identified himself with the centrifugal casting process with Stokes Castings, Limited, Mansfield, and Centrifugal Castings, Limited, Kilmarnock. In 1918 and 1919 he was Editor of THE FOUNDRY TRADE JOURNAL. He has been actively engaged and interested in research work in connection with cast iron, and is the author of the well-known text-books "Metallurgy of Cast Iron" (Sir Isaac Pitman & Sons, Limited, London) and "Melting Iron in the Cupola" (Penton Publishing Company). He has made numerous and original contributions to the Iron and Steel Institute, of which he is a member and a Carnegie Research Scholar, and also to various other societies and technical bodies. He is an active member of the Institute of British Foundrymen, being President of the Sheffield Branch in 1933, and has presented Papers to practically every Branch of the Institute. In 1932 he was awarded the Oliver Stubbs Gold Medal in recognition of his outstanding contributions to the metallurgy of cast iron, particularly in the form of new alloys. On the subject of centrifugal castings Mr. Hurst presented the Belgian Exchange Paper in 1924 and presented a Paper to the American Foundrymen's Association in 1926. For some years Mr. Hurst has conducted extensive research into the possibilities of hardening and tempering various cast irons and alloy cast irons. Results of some of his investigations have been presented to the Institute of British Foundrymen in a series of Papers commencing in 1930. Mr. Hurst is also a member of the Council of the British Cast Iron Research Association and a member of the Staffordshire Iron and Steel Institute.

INCOME.

	£ s. d.	£ s. d.
Subscriptions Received :—		
Lancashire		482 9 6
Birmingham		282 9 0
Scottish		311 6 6
Sheffield		237 6 0
London		366 19 6
East Midlands		156 10 0
Newcastle		148 11 6
West Riding of Yorkshire		126 10 6
Wales and Monmouth ..		93 9 0
Middlesbrough		81 18 0
Unattached Members ..		42 0 10
		2,329 10 4
Add : Subscriptions in advance, 1932	89 15 6	
Do. due, 1933 ..	99 4 6	
	£189 0 0	
Less : Subs. in advance, 1933 £97 2 6		
Do. due, 1932 .. 6½ 9 6		
	159 12 0	
		29 8 0
		2,358 18 4
Sale of "Proceedings," &c...		4 11 4
Interest on Investments and Cash on Deposit ..		50 6 10
Income Tax Refund ..		6 15 6
John Surtees Medal Fund Surplus		19 4 6
		£2,439 16 6

Finance

MR. W. B. LAKE, J.P. (hon. treasurer), presenting the accounts and balance-sheet for the year ended December 31, 1933, and proposing their adoption, said the details of the accounts differed only slightly from those of the previous year. Printing costs had increased slightly, due to the expense of the draft copies of the Rules and the preparation of the Institute's booklet on Microstructures, but he commented that the money had been very well spent. There had been a slight decrease in the expenditure on postages and in the audit fee, the latter decrease being due to the fact that in 1933 there was no expensive legal work in connection with the recovery of Income Tax.

The nett result was an excess of income over expenditure to the extent of £60 12s. 3d. The fact that, in spite of the great depression in the industry, the Institute had been able so to maintain its membership that it could show a credit balance on the year's work, was a great testimonial to the work of the Institute. There had been an appreciation of the Institute's investments. The amount paid for the various stocks held was £1,678 3s. 8d., and at current market prices those stocks were worth £2,037, so that the appreciation was roughly £300. Under all the circumstances, the position was satisfactory.

XUM

The motion for the adoption of the accounts and balance-sheet was seconded by MR. A. HARLEY (Past-President), and carried.

Report of Technical Committee

MR. J. W. GARDOM (Convenor of the Institute's Technical Committee) proposed the adoption of the Committee's third Annual General Report. He added that during the year the Committee had examined a report published by the British Cast Iron Research Association on the analyses of various metals, and was in favour of the adoption of that report by the Institute.

Commenting upon the devoted work of the members of the Technical Committee and its sub-Committees, he said that possibly it might be thought in some quarters that they were not doing much, and that if they gave only one hour per week to this work throughout the year it would amount to only one week's work in any whole-time research organisation. As an instance of achievement, however, he drew attention to the Technical Report produced by the Sub-Committee on Cast Iron, and said that if any research worker at a University could produce such a report in six months he would consider that he had done very well. It must be appreciated that the production of such a report must have entailed many hours of work.

MR. V. C. FAULKNER (Past-President), seconding the motion for the adoption of the Technical Committee's Report, said he had attended one or two of the Committee's meetings, and although he played only a minor rôle, he had been very much impressed by its work. The fact which had impressed him mostly was the speed with which suggestions were put into practice; the lag between suggestion and accomplishment was of the lowest possible order.

The CHAIRMAN also paid a tribute to the wonderful work of the Committee, which was done voluntarily and gratuitously, and said that it was essentially the kind of work that the Institute wanted to do. All the members could read about the researches of the British Cast Iron Research Association and other bodies, but in applying the findings of such researches in actual practice in the foundry and connecting up with them the Committee was performing a useful function. He could not praise the Committee's work too highly.

The report was adopted, amid applause.

THIRD ANNUAL GENERAL REPORT OF THE TECHNICAL COMMITTEE

The reorganisation which was explained in detail in the last Annual Report has been in operation during the past twelve months and has been completely successful. The Technical Council, which consists of the members elected by the Branches, together with the officers of the Technical Committee and the conveners of sub-committees, has met four times during the year, on the same days as the meetings of the General Council, and has dealt with matters of general administration. The full Technical Committee, consisting of the Technical Council, the whole of the members co-opted on the sub-committees on account of their special knowledge and certain ex-conveners of sub-committees, has held four meetings on dates approximately midway between the Technical Council meetings. Such meetings have been held at Carlisle (twice), London and Birmingham. These meetings of the full Technical Committee afford a method of reviewing the work of the whole of the sub-committees and provide the necessary liaison. The total number of sub-committee meetings which have been held is about forty.

In the last Annual Report, reference was made to the Technical Exhibit organised in connection with the International Foundry Exhibition in April, 1933. The Committee continues to receive evidence of the value of this exhibit in the interest shown in the development of foundry technique.

Inquiry Bureau

The Inquiry Bureau was commenced in October, 1932, for an experimental period of twelve months. This period has now been continued indefinitely, as it was found that the Bureau was of real service to members, as it provides a definite means of answering inquiries regarding publications and other matters of a technical character, which were not dealt with previously by any special machinery. Since the establishment of the Bureau 40 inquiries have been answered.

Publication of Technical Data

In the course of their work, the various sub-committees have collected and tabulated a large amount of data bearing on their respective subjects and careful consideration is being given to a suitable method of making this data available to the members of the Institute. A certain amount of matter relating to the properties of cast iron is already available to members on application to the General Secretary.

During the year the principal activities have been of a specialised character and have been carried out mainly by the various committees. Details of their work appear in the reports of these sub-committees which are appended to this report.

The Sub-Committee on Cast Iron has issued a booklet of Typical Microstructures of various types of cast iron. Copies may be obtained by any member of the Institute free of charge, additional copies may be had at the price of 2s. 6d.

At the Cardiff Conference held in June, 1933, a Paper by the Sands and Refractories Sub-Committee was presented entitled "Routine Methods of Testing Green Sand." During the past year the Sub-Committee on Cast Iron has carried out a large amount of experimental and investigation work on various phases of cast iron, including such subjects as porosity, contraction, the influence of phosphorus, etc. This work has been embodied in a report which will be presented by this Committee to the Manchester Conference in June next. These Sub-Committee reports follow the report presented by the Malleable Cast Iron Sub-Committee to the Newcastle Conference in 1932, and it is anticipated that further reports will be received at subsequent conferences from these and other sub-committees.

The Sub-Committee on Foundry Costing has made considerable progress under the convenership of Mr. Vincent Delport and is engaged actively in formulating proposals, which will be placed before the Institute in due course.

From time to time the Institute has been invited to put forward its views on draft specifications issued by the British Standards Institution and to participate in the work of other committees, both international and national. The Technical committee has now become the recognised medium through which the Institute participates in such work, and through which it is represented on these committees.

The Convener takes this opportunity of paying tribute to the devoted work done by the members of the committee and of the sub-committees. The members carry out a considerable amount of work in their own time and they attend meetings in various parts of the country, usually at the week-ends and at their own expense. The thanks of the Institute are due to them for their work for the benefit of the members as a whole and the industry in general. A considerable amount of time must necessarily elapse before work of this kind reaches a stage at which useful information can be published, sufficient work has already been published, however, to indicate that considerable progress is being made in almost every branch of modern foundry practice.

J. W. GARDOM,
Convener, Technical Committee.

REPORTS OF SUB-COMMITTEES

Sub-Committee on Cast Iron

As this sub-committee has been responsible for the production of a Technical Report for the Manchester Conference, there is little to report beyond the work described therein. The sub-committee has co-operated in the work of the Technical Committee by attending to queries raised in the Inquiry Bureau and other matters of general interest.

The preparation of the Technical Report has involved many meetings of the Sub-Committee, special meetings having been held in addition to the usual quarterly ones.

P. A. RUSSELL, Convener.

Sub-Committee on Non-Ferrous Castings

Since the record report issued a year ago, the Non-Ferrous Castings Sub-Committee members have held three meetings and attended four Technical Committee meetings in various centres. Their chief work has centred round the selected alloys to be recommended to the British Standards Institution for the simplification of numerous commercial specifications dealing with leaded gun metals and leaded phosphor bronzes. Certain modifications both in the suggested composition ranges and also the physical properties to be expected from these have been decided upon as the result of tests made by the various members, but before these were finally declared in the Paper proposed for the next Conference, it was agreed to get evidence of other founders. With this end in view several collaborators have been selected, whose work is now in progress, and until this whole scheme can be correlated it was deemed inadvisable to frame a final report on this piece of work. One outstanding feature of the work so far covered has been the demonstration of the usefulness of the two types of standard test-bar selected two years ago.

Other aspects of the work undertaken by the sub-committee have been the condensation of the various tables of standard physical data collected and also the answering of several technical inquiries which have been passed to them by the full Technical Committee to deal with. In connection with the Melting Practice Sub-Committee, details of all types of furnaces suitable for melting non-ferrous metals have been tabulated and will form a basis of joint work with their sub-committee as their work expands.

J. S. G. PRIMROSE, Convener.

Sub-Committee on Malleable Cast Iron

Much work has been done during the course of the last twelve months, but as the investigations in hand have been of considerable magnitude none of the work has yet been completed.

An investigation is in progress in connection with the possibility of utilising a standard size test-bar, but specifying different test requirements satisfactorily to represent different sections of metal. This work has involved the preparation of large numbers of test-bars, and at the present time these bars are undergoing or about to undergo annealing treatment. The work should be brought to a conclusion within the next month or two.

An attempt to correlate physical properties of malleable cast iron with microstructure has been in progress for a considerable time, and this work has also involved the preparation of numerous test-bars. It is expected that this investigation will be brought to completion during next year.

The Committee has taken up the question of "Tolerances on Dimensions" of Castings, and much work has been done in investigating the accuracy to drawings and patterns obtained in normal practice. In this work the Committee has received the co-operation of the Steel Castings, Non-Ferrous and Grey Cast Iron Sub-Committees, and the whole of the data will shortly be drawn together, and it is hoped to make some publication on the subject.

A. E. PEACE, Convener.

Sub-Committee on Sands and Refractories

In June, the Paper entitled "Routine Methods of Testing Green Sands" was presented to the Cardiff Conference. After this, opportunity was given for discussing the relative merits of various methods of testing, the Sub-Committee put forward in September, 1933, definite recommended methods for routine testing of green sands as follows:—

Use the A.F.A. test-piece prepared in the standard A.F.A. rammer.

Determine the permeability by the A.F.A. method in the A.F.A. apparatus or Richardson's modification.

Determine the bond strength using the A.F.A. standard rammed test-piece crushed in the B.C.I.R.A. compression-strength testing machine.

Determine moisture in the Speedy Moisture (patent) moisture tester.

Firms and individuals throughout Great Britain have been invited to use the recommended methods in practice over a period of about a year with the object of reporting their experiences of the methods.

The Sub-Committee is now engaged in correlating tests with practice with a view to determining the relationship between the bond and "lift," also what amount of moisture, permeability and bond strength is best for each type of green-sand casting.

It is also investigating what modified methods are suitable for determining permeability and bond strength in dry moulding sands and core sands. The Sub-Committee has already agreed that the A.F.A. method of determining permeability in dry sands is satisfactory.

A suitable instrument for determining the mould hardness is being investigated, also the relationship between mould hardness and permeability in order to determine the link between standard tests for permeability and the permeability of the actual moulds.

N. D. RIDSDALE,
Convener.

Sub-Committee on Melting Furnaces

The Melting Furnaces Sub-Committee has been continuing the work outlined in the last Annual Report. A report on the cupola furnace has been prepared and it is intended to amplify this by including recommended operating data for a 36-in. dia. (lined) cupola. With regard to non-ferrous melting furnaces, a schedule of the various types available has been drawn up, and it is proposed to collect operating data from published and other sources with a view to making a comprehensive report which will be of value to members.

At the request of the main Technical Committee and arising out of a discussion at one of the Branches, a questionnaire has been prepared and has been circulated to a number of foundries, on the subject of cupola linings and patching materials, with a view to obtaining authoritative data on the consumption of such material under different methods of cupola operation.

F. K. NEATH,,
Convener.

Sub-Committee on Steel Castings

The Steel Castings Sub-Committee has been investigating the casting of a valve, and eight firms have promised to assist and supply castings, some of which are completed.

These castings will enable the Sub-Committee to investigate moulding troubles, contraction and hot tears, together with the physical properties of the metals made under different processes. This will occupy a considerable time, and in the meantime we refrain from making any detailed report or conclusion.

R. J. RICHARDSON,
Convener.

Sub-Committee on Costing

The Costing Sub-Committee was definitely constituted in November, 1933, and immediately started its investigations.

Taking up the subject in relation to grey-iron foundries, it was decided at the first meeting that the system would be divided into four main divisions, as follows:—(*a*) Melting Department; (*b*) Moulding Department; (*c*) Core-making Department; (*d*) Cleaning and Finishing Departments. In addition, a number of auxiliary departments would also be considered.

The Costing Sub-Committee has agreed upon a number of suggestions covering the standard system of costs for the melting department, and it is felt that it would be very helpful if the proposed recommendations could be put before the foundry industry in order to obtain a reaction from those who show sufficient interest in the subject. It would thus be possible to obtain what might be valuable suggestions and constructive criticism, which would enable the Sub-Committee eventually to present a complete system embodying the best practice. As constituted at present, the Sub-Committee comprises five members who are fairly representative of various aspects of the grey-iron foundry industry, but suggestions from outside the Sub-Committee might fill certain gaps which may or may not exist in the proposed recommendations of the Committee.

MR. H. W. WINTERTON
(Junior Vice-President of the Institute of British Foundrymen).

MR. H. W. WINTERTON, who is chairman of Messrs. William Cumming & Company, Limited, of Glasgow, presided with distinction in 1929 over the Scottish Branch of the Institute of British Foundrymen, and was also at the same time President of the Foundry Equipment and Supplies Association. In 1933 Mr. Winterton was President of the Refractories Association.

A number of foundry owners have been asked to supply information concerning the system used in their works. From the replies which have been received, it would appear that a few very broad principles are more or less in use in all the foundries that have been approached, and these replies show that it would be difficult to compare costs accurately without a standard system that could be followed by the majority of foundries.

It is suggested that the best way in which to receive constructive criticism would be to submit before one or several of the Branches a short Paper summarising the proposed recommendations on melting costs. The Technical Committee and the General Council have approved of the preparation of such a Paper, and the Costing Sub-Committee hopes to be in a position to present it to the Branches after the month of November.

VINCENT DELPORT,
Convener.

The Oliver Stubbs Gold Medal

The CHAIRMAN announced that the General Council recommended the award of the Oliver Stubbs Gold Medal for 1934 to Mr. V. C. Faulkner (Past-President) for the wonderful way in which he had steered the Committee (as Convenor) which had been concerned with the establishment of a school of founding science in Sheffield. There were thousands of reasons why thanks were due to Mr. Faulkner for his work on behalf of foundrymen.

MR. FAULKNER said he was deeply moved by the kindness of the Institute in awarding him the Medal. Some 12 years ago he had had discussions with the late Mr. Oliver Stubbs as to the terms of the award, but had not dreamed at that time that he would ever be a recipient; he was indeed happy in the knowledge that he was to receive the award, by reason of his great respect for the name with which it was associated. The work which the Institute had been kind enough to recognise in this way had been very much a labour of love; other work that he had done, such as the preparation of the Bulletin, was much harder.

An Institute Medal

The CHAIRMAN said that the Oliver Stubbs Gold Medal was awarded for work done specifically in any one year. There were men, however, who by their continuous service accumulated a mass of credit over many years. In 1933, therefore, the Institute had presented a Medal to Mr. F. W. Finch (the Institute's first Secretary), and in 1934 it was decided to present a similar Medal to Mr. J. J. McLelland. (Applause.) The Chairman added that, as a resident of South Wales, where Mr. McLelland had done so much, he was delighted to be able to make the announcement.

Diplomas

The SECRETARY (Mr. Tom Makemson) announced that the following Diplomas had been awarded, for Papers read before the branches during the past session:—

Mr. W. G. Morgan: "Fettling Shop Efficiency."—Birmingham Branch.

Dr. F. Hudson: "Moulding Sand Control."—Lancashire and London Branches.

Mr. A. Logan: "Aspects of Non-Ferrous Founding."—Lancashire Branch.

Mr. T. Makemson: "Some Impressions of Czecho-Slovakian Foundries."—London Branch.

Mr. G. L. Bailey: "Porosity in Non-Ferrous Castings."—London Branch.

Dr. A. B. Everest: "Potentialities of Cast Iron."—London Branch.

Mr. J. Longden: "Cast Iron for Laundry Machinery."—Scottish Branch.

Mr. J. Roxborough: "Alloys in the Iron Foundry."—Sheffield Branch.

Mr. B. Gale: "Practical Considerations in a Small Jobbing Foundry."—Wales and Monmouthshire Branch.

Election of President

The CHAIRMAN, proposing the election of Mr. Roy Stubbs as President of the Institute for the ensuing year—a task which he regarded as a privilege—said it was difficult to assess the value of friendship, but one of the outstanding characteristics of Mr. Roy Stubbs was that he was a friend of every foundryman. He (Mr. Williams) had found in him a true friend during his term of office, and in electing Mr. Stubbs the Institute would be electing the right man, who would stand by the Institute in the coming year. His name was a household word amongst the

members, and it was indeed a pleasure to be able to propose his election.

MR. VICTOR STOBIE (Past-President), seconding, commented that Mr. Stubbs would be the youngest President the Institute had had for many years, and, like all who attained merited prominence in early years, he was undoubtedly one of great quality and a wise counsellor. He had the blood of Oliver Stubbs in his veins, but that was by no means the reason why he had come to the forefront; he had focussed the attention, the admiration and the esteem of all by his own unaided efforts. The Lancashire Branch, under his Presidency, had forged ahead, due to a great extent to the grit and determination with which he had conducted its affairs; that grit and determination, harnessed to the main body of the Institute, would produce wonderful results.

Amid enthusiasm the resolution was carried unanimously.

MR. STUBBS, responding, confessed that he was overwhelmed. At the same time, he was conscious of the very high honour conferred upon him, and was appreciative of the actions of those who had deemed him worthy of such a distinction. He was succeeding a long line of capable, energetic, sincere and prominent men in the industry, each of whom had added his own step of individuality in the march of progress that had brought the Institute of British foundrymen to its present standing amongst institutes not only of this country but of the world; and if he could add his little step forward in that march of progress he would be very happy. He tendered his sincerest thanks to all the Officers and members of the Institute for their kindness to him on this occasion, and to MR. WILLIAMS and Mr. Stobie for their very gracious expressions of goodwill.

Vote of Thanks to Retiring President

MR. STUBBS, taking the opportunity to propose a vote of thanks to the retiring President, said that Mr. Williams had placed the Institute under lasting obligations by the exceptionally active and constructive service which he had maintained continuously during his year of office. There was no doubt that the Institute had thereby gained greatly in prestige, and the members paid tribute to him, acknowledging their deep indebtedness for his wise counsel and tactful guidance.

MR. J. E. HURST (Vice-President), seconding, said he was voicing the opinion of all when he stated that no other President had wormed his way more quickly than had Mr. Williams into the esteem and real affection of every member of the Institution. One could feel assured that his year of Presidency would ever be remembered in the annals of the Institute.

The vote of thanks was carried with acclamation.

MR. WILLIAMS, with his usual modesty, said that a President could do nothing without the aid and support of the Secretary, the Vice-Presidents, the Council and the Committees; he was just one of them. If he had been of any service to the Institute and if he had done any of the members any good he was indeed glad. During his Presidency he had made a great many friends, and he valued friendship very highly; we brought nothing into the world, and we could take nothing out of it but friendship.

Election of Senior Vice-President

MR. STUBBS, proposing the election of Mr. J. E. Hurst (of Dronfield, Sheffield) as Senior Vice-President, remarked jocularly that he would not mention all that he knew of Mr. Hurst; he was a man known internationally, however, for his researches into the mysteries of cast iron. He had delivered numerous lectures—some of which the hearers agreed with and some of which they did not—and had written various text books which were regarded as classics. The members could be sure that under his (Mr. Stubbs') able guidance Mr. Hurst would make quite an efficient Vice-President. (Laughter.)

MR. C. D. POLLARD, who claimed the privilege of seconding the proposal, said that some people had honour thrust upon them, whilst others sought it. Mr. Hurst was not in the latter category, and he would honour the Institute by becoming its Senior Vice-President, and eventually, the members hoped, its President. As a member of the Sheffield Branch, Mr. Pollard assured Mr. Hurst of the whole-hearted support of that Branch.

The resolution was carried with enthusiasm.

MR. HURST, responding, said he regarded his election more in the nature of a compliment to the Sheffield Branch. It had already been indicated by Mr. Pollard that the members of the Branch were conscious of the honour done to them, and they hoped in due course to welcome the Institute to Sheffield. He would do all in his power to maintain the traditions of the Vice-Presidency and the Presidential Chair.

Election of Junior Vice-President

MR. J. CAMERON, J.P. (Past-President), proposed the election of Mr. H. Winterton (Scottish Branch) as Junior Vice-President, a task which gave him the greatest pleasure. He recalled that 10 or 12 years ago there had been tremendous difficulty in getting men to take office, and added modestly that he himself would not have been President but for that state of affairs; Mr. Oliver Stubbs had practically taken him by the ear and had made him accept the office, and there was no opposition. The Institute was to be congratulated, however, on the fact that to-day there are plenty of good men ready to take office, with the responsibilities attached thereto. Nowadays the Branch Councils were asked to nominate candidates for the Vice-Presidency, and it was the task of the Past-Presidents to make a selection and to place their decision before the Council. This year the task had been very difficult. Each district should have the right to provide a President from time to time.

Mr. Winterton was no stranger to the Institute; he had joined only a year after it was formed, and had been a good friend ever since. His sons and Mrs. Winterton were good friends and workers, and there were members of his staff who were good workers also. He was the nominee of the Scottish Branch, which was for the second time nominating an Englishman. The Branch had tried that experiment in the case of the late William Mayer, and it was so successful that one felt sure the Institute would again accept the proposal. Mr. Winterton would worthily maintain the traditions of the office, and after he had passed through the Presidential Chair, as it was hoped he would do, he would still maintain his interest in the Institute.

MR. SHARP, seconding, said all who knew Mr. Winterton would appreciate his geniality and his capacity for friendship, and that he was well fitted for the Vice-Presidency.

The resolution was carried with acclamation.

MR. WINTERTON expressed his thanks and hoped sincerely that he might give satisfaction to his many friends in the Institute. As far back as 1905 he was nominated a member of the Institute—then known as the British Foundrymen's Association—he was elected early in 1906, and since then his interest in the Institute had increased year by year. He would endeavour sincerely to support Mr. Stubbs and Mr. Hurst. Another reason he was glad to be able to take office was his conviction that research and the gathering together of those connected with the various branches of the iron foundry trade must be for the good of iron founders generally; he looked upon his election as a further indication that the members of the foundry industry realised that the whole must work together in order to achieve success.

Auditors

On the motion of MR. V. C. FAULKNER, seconded by the CHAIRMAN, Messrs. J. and A. W. Sully & Company (chartered accountants) were re-elected auditors for the coming year.

Assumption of Presidential Duties

The SECRETARY announced that, inasmuch as the Annual General Meeting was being held before the official opening of the conference by the Lord Mayor of Manchester, Mr. Williams had been asked the fulfil the duties of President until after the official opening of the following morning.

Election of Members of Council

It was announced that as the result of the ballot for the election of members of Council to fill vacancies, the following were elected:—Messrs. A. Campion, J. W. Gardom, B. Hird, J. R. Hyde, J. M. Primrose and E. Stephenson. Five were elected for two years, and Mr. Hyde for one year; the latter filled the vacancy due to Mr. Winterton's elevation to the Vice-Presidency.

Membership

MR. A. SUTCLIFFE made an appeal that the Institute should increase its efforts to attract greater numbers of practical moulders into its ranks. He pointed out that castings were made on the foundry floor, and not in the laboratory.

Mr. Stubb's Welcome

MR. ROY STUBBS extended to all members of the Institute a very sincere welcome to the City of Manchester, and expressed the hope that they would avail themselves to the full of Lancashire's characteristic hospitality.

Presentation of Presidential Badges

Following the business of the Annual General Meeting, the members joined their ladies at the informal reception and entertainment. There a very happy little ceremony took place, for collarettes were presented for the use of the President, the wife of the President, and for the Vice-President. The first was the gift of the Lancashire Branch, the second was the gift of the ladies of the Lancashire Branch, and the third was presented by Mr. and Mrs. Williams.

MR. A. PHILLIPS (Chairman of the Conference Committee) presented to Mr. Williams, on behalf of the Lancashire Branch, the badge to be used by Presidents on occasions when the usual chain and badge of office was too cumbersome. When the Lancashire Branch was honoured, he said, by the decision to hold the 1934 conference in Manchester the members had wished to mark the occasion in some suitable manner, and, having obtained the necessary permission from the Institute, had subscribed the money to provide a collarette to be worn by the Institute's Presidents. At a recent meeting it was the unanimous feeling that the Branch would be honoured if Mr. Williams were the first President to wear it; he had been an outstanding President, and it was hoped that he would live for many years to see it worn by his successors.

MR. WILLIAMS accepted the collarette on behalf of the Institute, and expressed his warm thanks for having been given the opportunity of wearing it, if only for a few hours. The large Presidential Chain and Badge, he said, was properly worn at functions of the Institute, and it was delightful that the Lancashire Branch should have hit upon the idea of providing a distinctive badge which could be worn by a President when representing the Institute at the functions of other bodies, where it would be out of place to wear the large Chain and Badge.

MRS. STUBBS, presenting to Mrs. Williams the collarette provided for the use of the President's wife, said that when the Ladies' Committee had heard that a collarette was to be presented to the President, they had decided to provide one to

be worn by the wife of the President when supporting her husband. They asked her to accept the collarette, with their good wishes and their love; she had charmed everyone by her personality, and it was hoped that her successors would fill the position with equal dignity.

There was great applause when Mrs. Stubbs, in making the presentation to Mrs. Williams, kissed her affectionately.

MRS. WILLIAMS felt deeply the specially graceful gesture on the part of the ladies of the Lancashire Branch in offering it to her in the first place, and she was indeed proud to wear it. She acknowledged also the pleasure she had derived from visiting various branches of the Institute, the members of which were particularly happy and friendly, and expressed the hope that Mrs. Stubbs would derive equal pleasure.

On behalf of Mr. Williams and herself, Mrs. Williams then presented to Mr. Stubbs a collarette to be worn by Vice-Presidents of the Institute. They felt that the Vice-President should have a distinguishing decoration, and it was presented as an earnest of their hope for great things to come.

MR. STUBBS, in accepting it, said he appreciated that he had been made the custodian of a very wonderful gift, and that Mr. and Mrs. Williams had tendered a substantial compliment to the Institute. It would perpetuate the memory of Mr. Williams' Presidency and of the conference held in Cardiff in 1933, and all who were given the honour of wearing it would think most generously of his and Mrs. Williams' kindness. He personally was proud indeed to be the first to wear it, and to have the opportunity of expressing the Institute's gratitude.

A Civic Welcome

The members and their ladies assembled at the Midland Hotel on Wednesday morning for the official opening of the conference by the Lord Mayor of Manchester (Alderman Joseph Binns, M.B.E.), supported by Mr. B. Mouat Jones, D.S.O., M.A. (Principal of the Manchester College of Technology).

MR. WILLIAMS (retiring President) introduced the Lord Mayor, who, appropriately enough, was a patternmaker, so that his presence was doubly appreciated.

The LORD MAYOR extended to the members and their ladies a hearty welcome to the city, and expressed the hope that the Conference would be in every way a success; he congratulated them also upon the fact that they were enjoying bright weather and upon the programmes arranged both for the ladies and the gentlemen, which indicated that they would enjoy a very happy time.

Though not a member of the Institute, he was a patternmaker by trade; also, occasionally he had had the misfortune to take charge of foundries, but, being a mild and gentle patternmaker in the early days, his methods were not quite forcible enough to project into the men under his charge that energy which would have made his management more effective. In his apprenticeship days it was recognised that if one wanted definite purposeful language whereby to put some vim into the men one could always find it in the foundry! As a patternmaker, he had taken a keen interest in metallurgy; he remembered the Institute being started in Manchester in 1904, for he was then a student in metallurgy (laboratory and practical) at the Manchester College of Technology; he believed that the class on iron founding at that College was the first in the United Kingdom. In 1904 he had passed through his final term in the metallurgical section and also the iron founding classes.

The Institute's Birth-Place

He was proud that the Institute had been founded in Manchester; during the past year he had attended some 70 or 80 dinners and luncheons as the guest of associations which had met in Manchester, and had found that so many of the bodies that were formed to co-ordinate the activities of specific industries or professions —from the chartered accountants to the undertakers—were founded in that city. This circumstance had arisen, he claimed, from the fact that South-East Lancashire was the first district in which many industries were developed intensively. The metal trades, the machine building trade, the development of power engines, had all come forward very rapidly in South-East Lancashire, and the necessity for organisation was proved in the first instance in a definite manner by labour. Later, the advantages of such organisation had caused the professional classes to consider the matter. The British Foundrymen's Association was formed in 1904.

He congratulated the Institute upon the arrangement of its printed matter, and said he had never seen anything better done by any of the other associations; it showed that its members, belonging to a calling which in the early days was referred to as that of the sandrats, were anxious to acquire fundamental knowledge and to see that the whole industry was so co-ordinated and regulated that the maximum efficiency would be attained. When he had been closely associated with the foundry industry it had in very few instances possessed those qualifications, but to-day it had sprung right to the forefront. Its members interested themselves not only in the ordinary productions of their establishments, but also in the fundamental education of the younger men. It was necessary to instruct them in the root principles, to give them an idea of the natural laws which required consideration to a greater degree in the foundry than in the majority of the engineering sections of the trade.

MR. J. E. COOKE
(The Honorary Convention Secretary).

Advancement in Foundry Knowledge

More than 35 years ago he had read a book on foundry practice, in which it was stated that if a moulder were to be successful he must consider certain natural forces which he could not balance up and work out in a mathematical sum and so arrive at a right valuation of his risks. In those early days the loam moulders, the men responsible for the laying out of the bed and for putting in the right amount of backing to allow the gases to escape when a heavy casting had to be made, did their work with calm confidence, and invariably they were successful. But in order to achieve that success they must have had an idea as to the amount of pressure that would be exerted upon the mould sides by the escape of the gases when the molten metal was poured into the mould, and if the walls had not the strength necessary, or if the boxes were not such as to afford a big margin of safety, the results would be disastrous, probably to the workmen, and certainly to the employers, for the castings would be lost. But nowadays the difficulties had been largely minimised by the fact that very often the men in charge had a thorough knowledge of stresses and strains, a good knowledge of the erosion process in metals, a better knowledge of the mixing of sands and of their solidity and of getting away the gases and air that must exude from the mould in the process of casting. He was proud to know that such a tremendous advance had been made.

When at the Metropolitan Vickers works during the previous week it had been his special pleasure to go into the foundry and to ask Mr. Jolley the extent of the improvements which had been achieved since the days when he himself was closely associated with foundry work, and had found that there were very marked differences. Changes were being made perhaps more rapidly in the foundry trade than in any other section of the engineering trade. He instanced the development of the metal mould, the more complicated moulds, and the more general use of mixtures of metals. He was in possession of three or four of the pocket books which were kept by foremen in the old days for their own private use; in those days the correct proportions of metals for different purposes were not ascertained generally, and the notebooks kept by the foremen allowed them to retain what they had called the secrets of the success of their foremanship. That attitude had ceased, however, and we were developing processes satisfactorily by the only sure means, *i.e.*, by the application of science.

Finally, the Lord Mayor wished the Institute every success in its efforts to develop the industry, in the interests of both employers and employed, to a high standard of efficiency and accuracy, so that it would continue to prosper and help Great Britain to uphold her traditions of best workmanship and of greatest satisfaction to her customers.

Presentation of Oliver Stubbs Medal

In presenting to Mr. V. C. Faulkner the Oliver Stubbs Gold Medal, the Lord Mayor recalled that he had had the pleasure of knowing Mr. Oliver Stubbs; he expressed the hope that Mr. Faulkner would continue his labours on behalf of the Institute, whose influence would continue to expand.

MR. FAULKNER said he was indeed proud to receive the Medal, which commemorated a name famous and honoured in the annals of iron founding; and he would not be regarded as conceited when he said that if his old friend Mr. Stubbs were still living he would be exceedingly pleased to see the Medal presented to an old friend, for it formed another concrete link between them.

Mr. Faulkner also took the opportunity to acknowledge his sincere gratitude to his Directors for their enthusiasm in facilitating any work he was able to do to help the Institute, and to his staff, who were always willing to undertake work thrown upon them by reason of his absence on Institute business.

A Tribute to Mr. McLelland

As the Medal which the Institute has awarded to Mr. J. J. McLelland, for his continued good work on its behalf, was not available for presentation at the Conference, the Lord Mayor shook hands with him in congratulation and wished him well in the future.

XUM

MR. MCLELLAND expressed his gratitude to the members of the Institute as a whole for the honour they had conferred upon him, and particularly to the members of the South Wales and Monmouthshire Branch Council, who had been most persistent in their efforts to ensure that he was so honoured. His position at the moment was somewhat unique, for he recalled that he was apprenticed to the foundry trade in Manchester more than 50 years ago. It was there that he had first learned the elements of the sand-rat trade, and he was glad to hear the splendid compliment paid by the Lord Mayor to those associated with him in that trade. Indeed, he was proud to be described as a sand-rat, for the sand-rat, so called, was engaged in a business which required the application of intelligence as well as physique.

A Further Expression of Welcome

MR. B. MOUAT JONES, D.S.O., M.A. (Principal of the Manchester College of Technology), extended a welcome on behalf of the educational institutions of Manchester. It was a particular pleasure, he said, to be able to do so, for the Institute of British Foundrymen had shown great interest in educational affairs; and if it shared the experience of other professional bodies its educational activities would extend more and more and would absorb a very great deal of its energy. Another reason why he was particularly glad to offer a welcome to the Institute was that the local Branch had held its meetings regularly over a period of 20 years at the College of Technology—from 1913 until 1933. It was a matter of some regret to him that the Branch had found it necessary to change its habitat; but when he had been told the reason for the change it had seemed to him so overwhelmingly cogent that he had not the heart to demur. The College of Technology did not possess a licence for the sale of alcoholic liquors—and the marvel was, not that the Branch had decided to hold its meetings elsewhere, but that it had remained at the College for 20 years! However, he was glad that the Junior Section, which had commenced to hold meetings at the College in 1924, was still meeting there, and he hoped a very long time would elapse before its members contracted that "thirst" for knowledge and experience which had constrained their elders and betters to seek new pastures and fresh water holes!

A still further reason why he was extraordinarily glad to welcome the Institute was that its newly-elected President, Mr. Roy Stubbs, was, like the Lord Mayor, an old student of the College; it was always a source of very great pride to be able to point to old students who had attained positions of eminence, and to take all the credit for their having got there! If Mr. Stubbs felt that he owed any debt to the College he could be assured that that debt had been more than amply repaid by the very great kindness and generosity of his firm, Messrs. Joseph Stubbs, Limited, which had always been an extraordinarily good friend to the College.

The College had always been in very close contact with the foundrymen of Manchester and district. In 1898—36 years ago—the foundrymen's classes were first started, and they had been carried on ever since; he hoped they would continue to develop and to maintain contact with the foundrymen. As the Lord Mayor had pointed out, in these days the relationship between the art and practice of founding became more and more and day-by-day interlinked with the fundamentals of metallurgy, and one would like to think that the local Branch of the Institute would make further use of the Metallurgical Department of the College.

A Vote of Thanks

On the motion of MR. WILLIAMS, seconded by MR. STUBBS, a hearty vote of thanks was accorded the Lord Mayor and the Principal of the Manchester Technical College for their expressions of welcome and goodwill, after which the Lord Mayor and Mr. Jones withdrew.

Installation of President and Vice-President

MR. WILLIAMS then formally invested Mr. Roy Stubbs with the Presidential Chain and Badge of office, and also handed to him the new collarette and replica of the badge to be worn on subsidiary occasions. He wished Mr. Stubbs the greatest success in his year of office.

MR. STUBBS then formally occupied the chair. He expressed the hope that he might carry the chain and badge with the same dignity as had Mr. Williams, and that he would be able to add lustre to the office.

In presenting the Past-President's badge to Mr. Williams, he said it was not only in finished undertakings that the Institute honoured him, but in the portent of still further achievements; it was hoped that the possession of the badge would inspire him in working out further benefits for the Institute. The good that he had done would live after him, and with cumulative value to the foundry industry. The members hoped that as the years receded this token would be treasured not alone for its significance; it carried with it the members' hopes for the continued health, happiness and prosperity of Mr. Williams and of those whom he held dear.

MR. WILLIAMS expressed his thanks, and added jocularly that its presentation carried with it a feeling of great relief.

The collarette for the use of the wife of the President was then formally presented by Mrs. Williams to Mrs. Stubbs, to whom wishes for her future happiness were expressed. Mrs. Stubbs very feelingly returned thanks.

The PRESIDENT then invested Mr. J. E. Hurst with the collarette to be worn by the Senior Vice-President, and invited Mr. Hurst and Mr. H. Winterton formally to occupy the Senior and Junior Vice-Presidential Chairs.

Greetings from Overseas

The following cablegrams were received from foundrymen's organisations overseas:—

From the American Foundrymen's Association:

"Please convey heartiest good wishes, American Foundrymen's Association, success Institute of British Foundrymen Conference. May their work furthering world advancement in foundry industry be stimulated, and far-reaching benefits be extended through participation large number British foundrymen in fifth International Congress in Philadelphia, October. Anticipate great pleasure in welcoming officers and representative members of that splendid group this fall.

FRANK J. LANAHAN, President."

From the French Foundry Association:

"Association Technique de Fonderie send cordial salutations to British colleagues and best wishes for the success of the congress.

M. L. F. GIRARDET, President."

Apologies for Absence

Apologies for absence, and expressions of good wishes for the success of the conference were received from Mr. F. P. Wilson and Mr. S. H. Russell (Past-Presidents), Mr. F. W. Finch (first Secretary of the Institute), Mr. Walter Flavell, Mr. J. B. Johnson, Dr. P. Longmuir, and many other members.

Visitors from Overseas

A hearty welcome was extended to Dr. Ing. Heinrich Nipper (of the Technical High School, Aachen, Germany), and to Mr. Williams, a steel founder from Calcutta.

The PRESIDENT then delivered his address.

PRESIDENTIAL ADDRESS

Mr. Williams and Gentlemen,—The measure of human progress, by which we gauge the difference between the centuries just passed and those of ancient times, is not the status of the isolated individual, but rather the amount by which the condition of the great multitude has been raised by the increase in prosperity, leisure and opportunity for happiness—by the increased facility the average man has for improving the position of those whom he loves and who are dependent upon him. If this be the measure of progress, then industry, of which we are all a part, has had more to do with progress than any other single factor.

If this be true, what is the position of our own calling in this picture?

When a mould is made, cast, the casting is taken down, fettled, and a finished casting produced, something absolutely new has been created. The pattern may be old, the design may be obsolete, but the object produced never existed before. When our foundries close to-night, the world is richer than it was when the sun rose this morning by the product that has been made. The foundry is not rehashing that which has been. It is creating something that is new; something to help the future of the race.

Notwithstanding that it is so old, we are beginning to realise that our industry is so complicated that we know little or nothing about it. Any man who handles molten metal is daily confronted with problems which tax to the utmost his ingenuity. A few years ago we used to judge pig-iron by its fracture. Then we called in the chemist, only to find that he did not tell us the whole story. Spurred on by the demands of society for a better and better product, we turned to the microscope and to instruments of which our fathers knew nothing. With them we began to explore our sands, our facings and our metals, only to find undreamed of mysteries challenging our intellect and demanding our best effort for their solution.

This Institute was born because it was realised that it is much better that men in an industry should help each other, rather than fight each other. It was born because men began to see that no matter how much an individual thought he knew about his own business, there was always someone who could tell him something which would be of advantage to him. It was born because the industry realised that with the tremendous problems before it, solutions could only be obtained by marshalling the best ability and the best brains for the attack. For after everything else has been said, the real object of this organisation is simply to discover the truth.

As is well known, the casting industry is an old one, dating back to prehistoric times. From these beginnings, castings of grey iron, of so-called semi-steel, chilled iron, malleable iron, carbon and alloy cast steels, and a multitude of brasses and bronzes, have been developed to a high state of perfection. In recent years these have been followed by the newer nickel-copper alloys, such as Monel metal, tin-nickel-copper alloys for greater hardness, silicon-copper, and steels of nickel-chromium, chrome-tungsten, chrome-molybdenum, and various others of the more highly corrosion-resistant type.

While the casting industry has developed commercially to gigantic size, castings of a large variety of shapes and sizes being available for various purposes, other products—forgings, stampings and welded products—some of them made by methods scarcely known even ten years ago—have come in to meet the multitudinous needs of present-day industry.

The revolution has not been confined to this, but has had a much broader scope, involving also, apparently to a much greater extent than before, the attitude of people toward life, toward fulfilment of desires, personal or otherwise, and especially in the willingness to pay

liberally for the fulfilment of these desires. The increased leisure resulting from the use of machinery which has minimised the need for manual labour has increased the means for employing leisure, such as the motor car, the "talkies," the wireless, etc.

High-Temperature Demands

A new factor, or rather one that has become magnified, has hastened developments which create uncertainty as to the ultimate status of some of these products—castings, forgings, welded assemblies, etc. This factor is the higher temperature desired for the chemical and mechanical processes which to-day are so much more efficiently making steam and electrical power, products for our motor cars, tractors and other machines, coke for smelting of materials, etc.

Undoubtedly, the higher temperatures and pressures have overawed designing and operating engineers, who, in a very proper effort to ensure safety in operation, have demanded perfection in castings. The recent development of the X-ray method of testing, along with the "marvellous" development of welding "advertising," have temporarily put iron and steel castings at a disadvantage.

It would appear that, if an equally vigorous campaign had been pursued by the producers of high-class castings, the advocates of forgings, of rolled products and of welded structures, would not have enjoyed all the advantages their publicity methods have gained for them.

Whilst problems due to metal cooling, solidification, shrinkage, grain formation, etc., still exist, the foundry product of to-day has been brought to a very high quality from the standpoint of operating permanence and safety.

The welded product, too, is subject to the working of natural laws, and the welding expert has his troubles, and often his unsatisfactory product. Forgings and rolled products are in much the same category as to the possibilities of flaws and weakness.

Thus it would appear that the castings industry awaits a champion!

It is not the function of this Institute to conduct extensive research; its function is to make available to members the results of the research of others. Research, as we know it to-day, is largely the very careful study of minute problems. It is intensive, whereas the broad divergence in the interests of our members force us to deal with more general questions. It is very expensive; but if we are to be of value to the small units of our industry, our subscriptions must be kept on a nominal plane. We have opportunities to join with other organisations in co-operative investigations for the solution of certain problems, and we can quite properly avail ourselves of every such opportunity to be of benefit to our members, but we should not assume that every research problem in the industry is ours, and that anyone else who assumes to solve one is usurping our prerogative. But one of the glorious things about our great industry is the fact that, generally speaking, those units which have the resources or the ability to discover new facts, or improve old processes, are more than willing to share that knowledge with those not so fortunate, conscious they advance only as the entire industry advances. There is no single problem of the business or economic world which does not have to be met at some time by one or all of our members.

The Scope of the Institute

Should our Institute assume the responsibility of solving all the problems of our industry, which is equivalent to solving all the economic problems of industrial society? Is it humanly possible that any one organisation can accomplish such a task? Will we best serve the interests of our members by "gadding about" all over the place, or by concentrating to secure solutions of particular problems?

There are many lines of endeavour in which the interests of all our classes are fairly identical; there are some in which the interests of competing classes are sharply antagonistic. We must agree that everything which improves the quality of the product of a foundry or a class of foundries by making that product of greater use to the human race, is beneficial in the long run to the entire industry, even though it be temporarily detrimental to the welfare of those members who refuse to change old methods in the light of new knowledge. But we must not engage in any activity which seeks to increase the business, or the interests, or the prosperity of any one of the classes at the expense of any of the rest of them. So far as possible we must serve the interests of all jointly, if we are to retain their interest and their co-operation.

We are, primarily, a technical Institute, engaged in studying and improving the product of our industry by taking some of the "guess" and uncertainty out of foundry operations. We are not a trade association concerned with commercial considerations, with merchandising problems, successful largely as their competitors succeed. To make technical information available to all members is the primary function of this organisation.

Nor is the task to be lightly assumed. The greatest menace to the success of the foundry industry lies within it, and does not come from the outside. The successful casting of metals is an exceedingly complicated art; the difficulties of making sound castings are great; the variables in the process, especially in making jobbing work, are numerous and hard to eliminate. Too often the designer, or the customer, considers the purchase of a casting of any sort as being more or less of a gamble, to be avoided if possible. Many times a sales department has reports that a customer who formerly used iron castings has been influenced by a low price or other considerations, and has purchased from a company who furnished an inferior product, with the result that the customer re-designed his machines and eliminated iron castings. In the long run society will use that product which has best served its purpose. The real job of this Institute is to help the industry to furnish a product that will the better serve society's needs.

MR. VINCENT C. FAULKNER
(Oliver Stubbs Medallist).

MR. VINCENT C. FAULKNER was trained at Wesley College, Sheffield, and in the Metallurgical Department of Sheffield University under the late Prof. J. O. Arnold. After spending a few years in the laboratories of the local steelworks, he assisted Mr. Victor Stobie in the erection of the Stobie steelworks at Dunston-on-Tyne, which involved much pioneer work in placing the electric furnace on a commercial basis. After a period as foundry manager to the National Steam Car Company at Chelmsford, he spent six years starting up Electro Metals and Greaves-Etchells furnaces in Great Britain, France, Spain and Italy, sometimes in foundries and sometimes in steelworks. In 1920 he was appointed Editor of THE FOUNDRY TRADE JOURNAL. He was quickly made secretary of the London Branch of the Institute of British Foundrymen, then its President, and in 1926 President of the Institute. That year also found him presiding over the Foundry Trades Equipment and Supplies Association. He has served continuously on the Council of the British Cast Iron Research Association since 1927. During the past year he has occupied the chair of the Sheffield University Degree Course Committee and has been successful in bringing the Committee's work to fruition. He has also recently been elected Vice-President of the Institute of Vitreous Enamellers and to the Executive Council of the National Ironfounding Employers' Federation. Mr. Faulkner is a member of the Iron and Steel Institute, the Institute of Metals, the American Foundrymen's Association, the Association Technique de Fonderie, and the Verein Deutsche Eisengiessereien, Giesserei Verband.

Kaleidoscopic Industry

In the foregoing I have no desire to be dogmatic. Problems of business are full of constantly-changing variables. They cannot be solved either by slide rules or formulæ. I have attempted to set down principles which, to my mind, underlie successful progress. As problems arise these principles must be interpreted to meet them, for the problems are often complicated and lie so close to the border-line between what is wise and what is unwise that a satisfactory solution can only be obtained by very careful judgment.

As we review the accomplishments of science and industry during the first part of this century, we can only be gratified to note that the foundry industry is keeping pace with the rapid strides that have been made in the application of the developments in chemisty, in specialisation—resulting in increased efficiency with its accompanying lessening of the strain on labour—and in the elimination of both physical and human waste.

We are living in a machine age, an age that is slowly but surely utilising the resources of this great nation, through the application of improved technique, in a way that is giving society the highest benefit for the least expenditure of both time and money. Science has been applied to all types of industry, resulting in the elimination of blundering and mismanagement.

Twenty-five years ago we would not have had the courage even to imagine the changes that have been wrought in both production and distribution methods.

It was not so very long ago that scientific methods were considered too much in the realm of theory to serve as an aid to industry. Yet to-day science is the chief ally, the very basis of industrial methods. But the technique of science has changed to a degree that parallels the changes in industry.

Instead of individualism in production, we have co-operation. Instead of haphazard trial-and-error methods, we have a sound scientific background. Instead of slow, tedious, hard work, we have machines, developed to an efficiency that the human factor could never attain.

Visualise a few of the results—the telephone, the motor car, the aeroplane, the radio. These comprise but a mere handful, important because of their commonness. The thousands of improvements in factory methods that enable these and hundreds of other specialising elements to be constructed so that they can be placed within the easy grasp of the average man, cannot even be considered here.

As members of the Institute of British Foundrymen, we can accept our share in these marvellous achievements. The foundry industry is

keeping pace with the times. Applied science, through the aid of the chemist and the engineer, is keeping our business on a par with all others.

Machinery for Advancement

New methods have been evolved to meet the production requirements placed upon our industry by the development of the automobile and other commodities. Improved alloys, simplified methods, new machinery, concerted effort and many other factors—all have been constantly in the throes of change and development to meet the increasing demands of the times.

These examples merely serve to indicate how we are answering the demands of the day. The successful foundryman is one who has the ability to assimilate present-day knowledge and put it into practice in terms of present-day needs. The detail man is essential to business, but the detail man does not supply the motive power that lies behind the industry.

Applied science is a modern thought. It is still more modern when applied to the foundry industry, for in spite of the progress we have made, we are young in the application of the practices of this machine age. We are having our whole economic plan altered. Those who can meet this situation will build for themselves a business raised upon a foundation that can never crumble.

New Tools Available

The greatest change in the industry has taken place in the foundry department, and the end is hard to foresee, because each new development seems to lead to new opportunities. The mechanical sand-handling and conditioning systems, mould conveyors and casting-cooling conveyors have become fairly established in the modern foundry, and it takes no prophet to foretell that within a very few years even the smaller foundries will find the sand-handling system as much a part of their equipment as the cupola itself.

On the face of it, this idea might seem impractical to those who are using two or three or more grades of moulding sand to suit their variety of castings. In time, competition may force some of these foundries into more specialised lines, but experience shows that one grade of sand may suit a much greater variety of castings than is generally believed possible.

There has been a great improvement in ordinary cast iron over the last five or six years. We have learned to produce iron consistently within very close limits in respect to Brinell hardness, tensile strength and machinability.

The rapid mechanising of foundry operations naturally had a pronounced effect on maintenance organisation. Where maintenance could be handled a few years ago by fitters and millwrights, to-day we require an engineering department and the leadership of trained engineers.

Unlike some other branches of industry, a foundry occupying the front rank has to develop the greater part of its new equipment, at least to the point where it can be turned over to some equipment builder. To accomplish this a thorough knowledge of foundry operations is necessary.

Due to the sand, dust and hot iron that are ever present, the wear on equipment is very heavy. Through strengthening of weak parts and the use of dustproof ball or roller bearings, we are constantly improving our conditions. Much, however, remains to be accomplished before we get our equipment as free from breakdowns and interruptions as some other industries.

Mechanisation

May I now for a moment or two deal with the question of mechanisation? We often hear people deploring the loss of craftsmanship, a loss which is supposed to be the result of mass production. Another statement that is frequently made is that the machine-made article, which is rapidly displacing the hand-made one, has been the means of lowering the quality of workmanship. May I take these two points and review them from certain angles to show how perfectly futile both views are.

In the first place, I want to repudiate the idea that the machine-made article is inferior to those made by hand. This idea is so entirely opposed to facts that wherever it persists, then you may be sure there is an unbalanced mentality. Since the introduction of the machine there has been a steady and continual improvement in the standard of output of every commodity that helps to make life brighter. Running parallel with this improved output we have had at all times an improved standard of quality; a quality in the majority of cases which can only be achieved by the use of the machine. We have the well-known fact that one of the earliest difficulties of Watt in bringing out his steam engine was the failure of his attempts to bore the cylinders, and it was not until Wilkinson invented his boring machine that Watt was successful with his steam engine. Since that day this condition has been multiplied innumerable times. Anyone who knows the foundryman's business knows that our present position could never have been achieved at all without the use of the machine, and in many cases where we could have got something of the same kind, the cost would have been so extraordinarily high that we should never have progressed, simply because the market would not have been there for our goods.

It is a mistake also to think that mechanisation tends towards the elimination of either the artist or the craftsman. For instance, most of you have seen recent reproductions of the work of artists who have long been dead. These reproductions may take the form of etchings, or of coloured pictures done by the three- or five-colour process. Now it is a well-known fact that many of these reproductions are more nearly true to scale and to colouring than were the originals. The men who are doing the preliminary work for these processes are artists in the true sense, exactly as were those who made the original drawing or painting, but the mechanisation of production has made it possible to place copies of these works into the homes of the masses instead of confining the work to either the homes of the rich or to picture galleries.

In what way has mechanical process done anything to reduce the importance of the artist? Looked at from the point of view of payment for work done, there never has been a time when the artistic sense of conception and execution gave greater monetary returns to the artist than is the case to-day. If, then, the work of the artist is made available for more people to enjoy, and if, further, the artist is better paid than he used to be, how can it be said that mechanisation is gradually eliminating both the artist and the craftsman? It is not true, gentlemen, and the statements, when they are made, arise from lack of balance on the part of those who make such statements.

On craftsmanship alone, and confining it to our own business, there is no foundation in the statement that there is lack of craftsmanship. There is, however, a displacement of craftsmanship owing to the rearrangements in the methods of doing the work. We can now, when the work is of a repetition character, eliminate the skill of the craftsman in the foundry, but in such cases we need his help in the tool room. I want everyone to realise this fact, that somewhere in our organisation we ought to be building up craftsmen all the time. We are. We take an unskilled man; we put him on a moulding machine, if we are wise we train him along certain lines. Eventually that man, who was once a labourer, will become a skilled moulder. Skilled probably along a narrow line, but with the skill that is higher than could possibly exist if his training were made more general.

To-day is the age of the specialist, and while there are some people who are foolish enough to think that specialisation in the foundry deadens the mentality, such people are back numbers, and if they would only examine their own mentality, they would be rather surprised at their lack of balance.

Recruitment Problems

It is the habit of foundrymen, as well as those engaged in other industries, when a number of them get together, to discuss their troubles at length. They usually begin by saying that the industry is going to seed in general, and then take up their problems in detail. They recount various troubles—arising from the low prices which prevail in the industry, the intense competition amongst themselves and the complications brought on by the advance of competing processes—they bring up the impossibility of getting good moulders, and deplore the passing of foundry craftsmanship.

Even those foundrymen who have established their plants on a production basis, with a large proportion of machine work, continue to be handicapped by the lack of men to supervise and lay out the work.

It is commonly held that modern young men are weak, lazy and effeminate, that all of them want to work in banks or insurance offices, or do something which permits them to sit at a desk and wear a white collar. It is pointed out that all are afraid to soil their hands, and that they think about nothing except amusement and the lighter forms of enjoyment.

The so-called old-style young man—stout, bright, alert—is said to have passed out of the picture. It would appear that no young man can be induced to enter the foundry trade under any circumstances whatsoever.

Much of this kind of discussion is based on facts. It is true that very few boys are going into the foundry industry at the present time. It is unfortunate, of course, that young men do not rush into foundries; but is it not equally true that foundrymen as a rule make no effort to attract young men?

I have seldom heard any of them make definite plans for solving the problem. They assume that the fault lies entirely with the young men, and few of them have conceived the idea that possibly foundry management is partly at fault. And yet, no industry and no organisation can remain secure which does not constantly attract young blood to itself.

A strong human element must always be fundamental to every industry. We may build the finest foundries in the world, equipped with the newest and best furnaces and cupolas, the best of moulding machines, the most efficient sand-handling equipment; but unless this wonderful plant is operated by first-class foundrymen it will not succeed.

It is true that self-trained men have successfully operated old-fashioned foundries in days gone by, but the very complexity of our modern equipment, and the multiplicity of our requirements, call for a training unknown in former times. While our fine modern equipment is of great help to all of us in the foundry industry, it will not do away with the necessity for careful and intelligent training. Man is still superior to the machine—man still controls the machine; the machine does not control the man.

Modern engineering, with its sand-handling equipment, is constantly lightening the load, and modern thought is constantly improving conditions of labour. We have an industry full of problems and full of interest, which recognised and properly interpreted to youth, will do much to counteract this feeling.

Variables to be Reconciled

Where can you find an industry whose roots go back so far into the foundation of society as the casting of metal? What other industry presents so many problems to the inquiring mind—problems of mechanics, problems of physics, problems of chemistry and metallurgy, problems

of gases, problems of fluids, and problems of solids, and of the forming of one from the other?

What other industry retains so much of individualism? The production of a jobbing casting, at least, is an art instead of a stereotyped process, more like the painting of a picture or the chiseling of a statue than the dull mechanical process existing in some trades. In what other industry do we so easily feel the pleasure of creating that which is new, that which because of our efforts exists now, but has never existed before.

If we who live by the industry have never appreciated its romantic side, why should we feel surprised that youth, which sees it superficially, should miss it? Why should we blame the young man for our failure to point out to him the worth-while parts of the industry in which we are engaged?

It is no doubt true that modern methods of manufacturing, including the foundry, have substituted machines for hand skill in many directions. At the same time, it is true that in every industry and in every foundry, high-grade men are required to supervise, direct and lead the work, and the need for such high-grade men is even greater now than it was in the old-style foundry.

It is also true that in our jobbing foundries there will always be quantities of work in which the machine can be used only to lighten physical labour, and where the skill of the trained artisan must always be relied upon to produce satisfactory results.

Dearth of Young Foundrymen

Where are our young foundrymen? There are very few. The best foundrymen are of middle age or older, and yet no industry can continue unless it builds up a generation of young men.

We must bring large numbers of young men into this industry, we must show them its attractive features, we must train them into the knowledge and skill which we possess—or we shall find ourselves falling behind in our ability to satisfy the increasing demands necessary to meet society's onward progress.

What have we done to attract young men? As an organised industry, we have done little or nothing. I doubt whether we have yet appreciated the necessity of doing anything, nor have we recognised this as a definite obligation on ourselves or our industry. Moulders have come to us, in the past, as easily as the air we breathe. We have not realised that this condition might not always continue.

I gladly acknowledge that there are some notable exceptions, some individual foundries and local associations which have embarked upon training programmes that are a distinct credit to them. As an industry we have not approached the realisation that the public judges the value of a calling by the time and effort it takes to master it.

I do not believe that the youth of to-day is essentially different from the youth of any other day. He realises that he must face different conditions, and he naturally expects to face them in a different manner, but there are still large numbers who realise that they were not born to be kings—who are quite willing to become good craftsmen if we but approach them in the proper manner and show them an opportunity in accordance with modern conditions.

I am not only urging the training which will qualify boys for positions as foundry executives, but also that which will produce good mechanics, thoroughly-skilled moulders, or coremakers, or patternmakers, or cupola operators. To accomplish this, we must recognise the need, we must believe in the work and the value of the results we are going to attain, and we must really want to do it and not feel that we have been pushed into it, or we shall not be able to interest the boys and make them enthusiastic about it.

To be successful in this work, a company must organise on the same principle that it organises to buy its raw materials or develop its cost figures or to handle metallurgical research problems. It must set as its goal the training of certain young men, the making in this particular department, not of moulds, but of moulders.

Just how the details should be accomplished, I leave to those who have devoted more time to the study of this subject that I have been able to do. But I am quite sure that, in general, the time has come when we must devote thought to this question, and that when we tackle it with the energy and the intelligence of which the industry is capable, we shall not have to ask "Where are the young craftsmen?" in vain.

However, I think we all appreciate that a youth in his teens, under proper guidance, would naturally develop into a better workman. We believe this, and are backing up this belief. We have trained a number of boys during the past few years, we have a number now in training, and we also employ a number who are out of their "time."

We sometimes hear men of intelligence ask the question "Why train apprentices to-day in the foundry when machine methods destroy the opportunity to absorb the skilled men?" My answer is that if we ever needed men of mechanical ability and practical training in the foundry, we need them now.

Competition was never keener than at the present time. New processes are making inroads into the foundry industry and call for keen, intelligent men to raise the standards of the foundry in every particular, and place it in its proper place in the manufacturing group.

After all, in our basic industry, the manufacturing cycle usually begins with castings. If we can, by using intelligent methods, produce something superior to that which was in times past the source of so much trouble and economic loss, we shall at least have made our contribution to the progress of the age.

Some of us, after an active career in many different directions, are in a position to advise and guide those who are starting out with their future still to make, and are willing to help all we can, by personal advice, anyone who is interested in his own future. When, in retrospect, I think of the many changes that the average young man has to make before he finds his level and becomes satisfied that he has entered upon an activity which warrants the application of the best that is in him, I often wonder whether the present younger generation is willing to recognise, at least in a general way, the value of the advice that the older generation is capable of giving.

The Work of the Institute

I want to say just a word on the character of our Institute, for organisations of this kind do have character, irrespective of presidents who come and go, like the changing seasons. I have been a member of a good many organisations, but never one the members of which were of a higher character or so conscientiously devoting their time and the best of their ability to the interests of the organisation. There is a close association between foundrymen and the representatives of the equipment manufacturers, but I have never heard one of the latter advocating a policy which might be of disadvantage to the foundry industry. Their action has indicated that they feel that their own interests can best be advanced by that which best advances yours.

I have never known an organisation in which I felt that those who represent the members in executing their work were functioning with higher ideals or with a more earnest desire faithfully to discharge the trust placed in them.

In conducting the affairs of your Institute there is a vast amount of detail to be accomplished. Each President realises fully the correctness of this statement. I cannot refrain from expressing my sincere admiration of the work of your Secretary, Mr. Makemson, and his very able staff. This may seem like a formal courtesy, but I am only voicing a sincere conviction resulting from some years' close contact and observation of this work. I have seen so many instances of administrative ability, sound business judgment and straightforward dealing coupled with fine diplomacy that I would be remiss if I did not direct your attention to it.

I wish also to take this opportunity of expressing my appreciation of the interests and co-operation of all the Past-Presidents who have so graciously given of their time to help whenever called upon, and who are so well qualified by their broad business experience and by their intimate knowledge of the affairs of this Institute to give advice and counsel. We are indeed fortunate to have so many Past-Presidents who continue to take an active interest. I shall deem it a personal obligation to continue an active interest and helpful participation in the affairs of the Institute after my official contact ceases and I sincerely trust that such humble effort as I may be able to make will be productive of at least a slight increment of progress and growth.

The Institute of British Foundrymen has constantly aided the industry in developing new methods of meeting new conditions. It has enabled knowledge to be disseminated for those who would take it. It has been the clearing house for a grouping of ideas to which all might contribute and from which all might benefit.

Our task is a never-ending one. Although marvellous changes have been wrought in production, although unimagined results are being attained, although the technique of distribution has reached a peak never before realised, actually, only a start has been made along the road of industrial progress. Through careful and keen observation, through scientific experiment and the subsequent gathering of data, through the application to our industry of the improvements thus discovered, and above all through intelligent co-operation, we may hope to achieve in times yet to come a large measure of the success that should be ours.

Civilisation will continue to progress. Science will be for ever discovering new processes, and production and distribution techniques must continue to evolve.

To us falls the burden of seeing that the foundry industry, functioning as it now is upon a solid economic basis, will continue to meet the demands of the times.

It is a wonderful thing to be connected with industry in this great industrial world, where each man is honestly striving to make money for himself and those dependent upon him, conscious, however, that the only way in which he can attain this goal is by rendering to society a service by which he gives it more than he gets back. It is a wonderful thing to be connected with an industry which is so old that we cannot find where it began, and yet which is so young, so inexperienced, so unknown that it challenges the best of our executive ability, the best of our engineering skill, the best of our scientific research. It is a significant thing to be connected with a great organisation of this kind, where men are meeting together, each one to help himself by helping his competitor, where men are willing to devote their time, their work and their money in an effort to make of their industry an instrument which shall be of greater worth to the world and produce more happiness for the children of God.

On the motion of MR. C. E. WILLIAMS (Past-President), a hearty vote of thanks was accorded the President.

The Foundry Course at Sheffield

The PRESIDENT, dealing with the establishment of the Degree Course at Sheffield, said that the Institute had always taken a prominent part in promoting technical education for the foundryman, and suggestions had been made frequently as to the desirability of establishing a Degree Course in the science and technique of

foundry practice. The Sub-Committee of the Institute, which had been at work for a considerable period, had collected promises of sufficient financial support to enable such a course to be inaugurated at the University of Sheffield. That course was an established fact, and would commence next autumn.

It consisted of a four-years full-time course leading to the Degree of Bachelor of Metallurgy (Founding). The industry was indebted to Prof. J. H. Andrew (Prof. of Metallurgy, Sheffield University), who was responsible for its inauguration and for the preparation of the syllabuses, copies of which would be available for distribution at the Conference, and he would be in charge of the course.

Increasing numbers of graduates, continued the President, were being absorbed into the industry, but up to the present they had usually taken their degrees in Metallurgy or Engineering. In future they would be able to take a degree in Founding.

It should be understood that this course was of a national character, and was open to students from all parts of the country. It was hoped that members of the Institute would make known the inauguration of the course, endeavour to attract suitable students to it and to increase the financial support which had already been promised.

Greetings to Original Members

Of the 16 original members of the Institute who are still living, 7 were present at the meeting, and the President extended to them the congratulations of the Conference. They were Mr. C. E. Williams, of Cardiff (Past-President); Mr. F. J. Cook, of Birmingham (Past-President); Mr. J. T. Goodwin, of Chesterfield (Past-President); Mr. J. J. McLelland, of Bilston; Mr. T. W. Markland, of Bolton; Mr. K. M. Burder, of Loughborough; and Mr. W. H. Meadowcroft, of Burnley.

The remaining original members, to whom the meeting sent messages of congratulation and good wishes, in accordance with the resolution adopted at the Annual General Meeting, were:—Mr. F. W. Finch, of Gloucester (the Institute's first Secretary); Provost James Galt, of Paisley; Mr. R. W. Kenyon, of Accrington; Dr. Percy Longmuir, of Sheffield; Mr. D. Aston, of London; Mr. Jas. Chadwick, of Bolton; Mr. James Smith, of South Shields; Mr. W. H. Sherburn, of Warrington; and Mr. W. R. Wilson, of Liverpool.

The meeting then proceeded with the reading and discussion of Papers.

A full report of the speeches made at the Annual Banquet held at Manchester on Wednesday, June 6, will be published in our next issue.

Iron and Steel Merchants' Meeting

CO-OPERATION WITH THE FEDERATION

A largely-attended meeting of merchants interested in the iron and steel industry, from all parts of the country, including Glasgow, Newcastle-upon-Tyne, Middlesbrough, Liverpool, Manchester, Birmingham and Swansea, was held at the offices of the London Chamber of Commerce recently.

The position of the merchant in relation to the proposed constitution of the British Iron and Steel Federation was considered, and the meeting unanimously expressed itself as desirous of co-operating to the utmost with the Federation. A committee representative of the main centres and trades was appointed for this purpose, with a view to furthering the sale of British iron and steel products both at home and abroad.

Electrodes for Electric Furnaces

Recent advances in the manufacture of electric-furnace electrodes, with special reference to the Söderberg electrode, are described by C. V. DELWIG in "Jernkontorets Annaler."

Silvery Iron

By A. H. DIERKER

(Research Engineer, Engineering Experimental Station, Ohio State University, U.S.A.)

Hidden away in the hills of south-eastern Ohio is one of the important industries of the State. In the little city of Jackson is produced two-thirds of the silvery pig-iron made in the United States. The production is divided between two blast furnaces, "Globe," owned by the Globe Iron Company, and "Jisco," owned by the Jackson Iron & Steel Company.

Jackson is in the once-famous Hanging Rock iron-producing district, extending from the north-east corner of Kentucky up into Ohio as far as Wellston. In the middle of the nineteenth century this area was one of the great iron-producing districts of the country and once boasted of 26 blast furnaces. Of these "Globe" is the only one in operation to-day, "Jisco" having started operations after the development of the modern hot-blast coke furnace.

Silvery iron is really a ferro-silicon with a silicon content ranging from 5 to 17 per cent. It is produced in a blast furnace by reducing a siliceous iron-ore charge with an excess of fuel. Because of the extremely-high operating temperatures of furnaces producing this iron, extra precautions are required in their construction and operation. High-blast temperatures require a large stove capacity, and to maintain this capacity, unusually clean gas is needed, necessitating cleaning equipment of high efficiency.

In the early days of pig-iron manufacture the iron was classified according to fracture. A representative pig from a particular cast would be broken in two, the fracture examined and the iron classified as A-1, No. 2, etc., according to the appearance of the fracture.

Occasionally the furnace would produce an off-grade iron, one that would not fall in with the regular grades. Its fracture was a light grey and had a silvery lustre, so this grade came to be known as silvery iron. Foundrymen who tried it in the cupola charge found that it had a marked effect on the product. Only a small amount added to the regular charge caused the resulting grey iron to be much "softer." Hence this silvery iron came also to be known as a "softener."

About the year 1890, J. E. Jones, then manager of the Globe Iron Company, realising that this "off-grade" iron had commercial possibilities, started manufacturing it purposely in the Globe furnace. As the market for the regular grades of iron dwindled, the furnace was put on the production of silvery iron exclusively, and has continued on this type of iron up to the present time. The gradual increase in demand for silvery iron is indicated by the growth in capacity of the Globe Furnace.

Year.	Daily capacity. Gross tons.
1890	15
1903	100
1912	120
1932	250

Silvery iron is manufactured in a number of grades with the silicon content ranging from 5 to 17 per cent. It is also graded according to its phosphorus content. The standard silvery iron has a phosphorus content above 0.10 per cent. When the phosphorus is under 0.10 per cent. the product is known as Bessemer ferro-silicon.

Silvery iron or blast-furnace ferro-silicon is used in every type of iron and steel manufacture. In grey-iron foundries it is used to increase the silicon content of the cupola charge. In recent years grey-iron foundrymen have been increasing the amount of steel scrap in their charges in order to meet the growing demand for iron of better physical properties. This steel has a very low silicon content, and the necessary silicon in the charge is in many cases secured by adding silvery iron. Some foundries have abandoned the use of regular pig-iron, their charge consisting entirely of steel scrap, return scrap (sprues, gates, etc.), and silvery iron.

Malleable-iron shops have for years been large users of silvery iron to secure the required silicon content in their product. A considerable tonnage of this iron finds its way into open-hearth furnaces. Here it is used principally to stop carbon oxidation when the carbon in the bath has been reduced to the proper point. A more recent use of silvery iron is in the manufacture of acid-resisting castings of the high-silicon type.—"Engineering Experiment Station News," Ohio State University, U.S.A.

Formation of Graphite Nuclei in Cast Iron

By determining under the microscope the number and size of graphite nuclei in the grey portion of chilled cast-iron bars, E. Scheil, W. Ruff and E. H. Schulz* have found that the number of nuclei decreases from the rim to the centre of the bar, whereas the average size increases. This shows that the nuclei do not grow immediately after the temperature has fallen below the freezing point. Like the spontaneous formation of nuclei, the stimulation of the graphite crystallisation by residual nuclei (undissolved graphite particles) requires a certain time. Therefore, each residual nucleus must not initiate crystallisation, but may remain ineffective if the crystallisation rate of the cementite be sufficiently high. With increasing degree of supercooling the number of developing nuclei increases, whilst their size decreases, because the crystallisation rate of the cementite eutectic increases more rapidly than that of the graphite eutectic. The existence of an incubation period could also be stated in experiments on the effect of superheating upon the nucleus formation of organic substances, and the transformation of austenite into pearlite.

Apart from germ-destroying processes, there occur also germ-generating processes in the melt. So, it was found that a cast-iron containing about 0.75 per cent. of carbon was practically free from germs shortly after melting down in a reverberatory furnace. From this time onward germs began to form. Even minute additions of silicon and aluminium caused the number of germs to increase considerably.

In irons rich in silicon, which were cast in iron moulds at 1,500 and 1,300 deg C., the number of nuclei increased with decreasing casting temperature, whilst the size of nuclei decreased. When carbon monoxide was passed over the melts to protect them from oxidation, the number of nuclei decreased with decreasing casting temperature. This shows that the absorption of oxygen promotes the germ formation. Granulated carbon acted like carbon monoxide; an innoculating effect could not be stated. Coke-oven gas had no protecting effect. To the absorption of oxygen must also be attributed the formation of a surface film on liquid cast iron, which could be observed at temperatures up to about 1,370 deg. C. At higher temperatures the film disappeared and reformed on cooling the iron below 1,370 deg. C. The rate at which this film reappeared was a criterion of the tendency of the iron to solidify grey.

In some cases inverse chill was found in castings of the second and third cast after the melt had come into contact with the air during the first tapping of the furnace. In practice, the conditions under which a grey rim is formed will be frequently encountered. The increased graphite formation in the outer layers will, however, become conspicuous only in the case of irons the tendency of which to solidify grey is small. Inverse chill is, therefore, unjustly regarded as a strange phenomenon.

* Archiv. für das Eisenhuttenwesen, vol. 7 (1933-34). No. 6.

This Week's News in Brief

Trade Talk

THE EDINBURGH CORPORATION have decided to purchase a new all-steel turntable fire escape of 105 ft. extension, and tenders are now being invited by the town clerk.

THE VULCAN FOUNDRY, LIMITED, Newton-le-Willows, has secured an order for 30 steam locomotive boilers and 15 sets of cylinders for the Eastern Bengal Railway.

ORDERS for 1,072 new road motor vehicles and trailers have been placed by the L.M.S. Railway with British manufacturers. These orders form the L.M.S. programme for 1934.

THE NEW MOTOR-SHIP which is to be built on the Tyne for the Melbourne Steamship Company, Limited, is to be supplied with machinery built by Messrs. John G. Kincaid & Company, Limited, Greenock.

BRADFORD CORPORATION BUILDINGS COMMITTEE have approved plans for extensions at the works of Hepworth & Grandage, Limited, engineers and foundrymen, St. John's Works, Ounsworth Street, Bradford.

MESSRS. LITHGOWS, LIMITED, Port Glasgow, are to build two large steamers for Messrs. J. & C. Harrison, Limited, London. This firm has had ten vessels completed by the Port Glasgow company during the past two years.

THE BUSINESS OF Messrs. Hobson, Houghton & Company, Limited, Don Steelworks, Saville Street, Sheffield, has been purchased by the Neepsend Steel & Tool Corporation, Limited, and will be carried on by that concern without change of title or premises.

MESSRS. ALEXANDER HALL & COMPANY, LIMITED, have launched from their Footdee yard, Aberdeen, a steel-screw sea-going tug, which they have built for the Sudan Government for service at Port Sudan. The machinery for the vessel is being supplied by the builders, and consists of triple-expansion engines supplied with steam at 200 lbs. per sq. in. pressure.

A LARGE CONTRACT for aeroplane hangars has been placed by the Air Ministry with Redpath, Brown & Company, Limited, for which approximately 7,000 tons of British steel will be required. The structural steelwork will be fabricated partly at the company's Scottish works and partly at their Manchester works. There will be thirteen hangars in all, seven to be erected in Iraq, one in Egypt and five in Great Britain.

THE DRIVE organised by the counting-house staff of Carron Company, Falkirk, which has come to be recognised as an annual affair, took place on June 2. Accompanied by a number of friends, the party travelled in motor-coaches to Gullane in brilliant sunshine. Tea was taken in picnic fashion on the sands under the direction of the ladies of the party. The homeward journey was made by way of Port Seton, Prestonpans and South Queensferry.

THE STAFF OF Messrs. R. & A. Main, Limited, Gothic Iron Works, Falkirk, had a very enjoyable outing on Saturday, June 2. Leaving Falkirk early in the morning by special train for Wemyss Bay, they embarked on the L.M.S. turbine steamer "Duchess of Argyll" for a cruise round Arran and through the Kyles of Bute. Mr. C. McLean, on behalf of the staff, proposed a vote of thanks to the directors of the firm for so excellent a holiday.

AT A MEETING of the Corporation of Glasgow, this week, the Town Council rejected by 51 votes to 47 the offer from Messrs. William Baird & Company, Limited, to deliver 6¼ million cub. ft. of coke-oven gas per day into the gas mains of the city at a price of 8.4d. per 1,000 cub. ft., and without discussion the further offer of Messrs. William Dixon, Limited, to supply 4 million cub. ft. of gas per day from new plant to be erected at Govan Iron Works was also rejected. It has been stated that Messrs. Baird & Company, Limited, will not proceed with their development scheme at Gartsherrie, even though a period of from one and a-half to two years must elapse before the plant would be erected and in production, and during the interval approval might be obtained.

SINCE THE BEGINNING of the year there has been an appreciable rise in the price of old tonnage for scrapping purposes on the growing demand. During the first quarter of the year 45 British vessels of 174,815 gross tons were sold for breaking up, whilst the world's total was 141 vessels of 454,107 gross tons. At the beginning of the year the price stood at about £1 per ton, an extremely low figure ruling for a long while past, but by the end of March it had risen to 23s. 6d., and now stands at over £2. The rise has been particularly marked in South Wales, where there is now a tendency to retain vessels and several boats that were on the market to be sold in January have now been withdrawn. For those disposed of lately, distinctly better prices have been obtained, £12,000 being paid by Arcos, Limited, for the "Sunray," 5,300 tons, which they bought from the Cardigan Shipping Company, Limited, whilst £11,000 was secured for the "Harry Walton," 3,661 gross tons, which was bought by Messrs. Mark Whitwell & Sons, Bristol.

New Companies

(From the Register compiled by Jordan & Sons, Limited, Company Registration Agents, 116 to 118, Chancery Lane, London, W.C.2.)

H. H. Wardle (Metals), Limited.—Capital £2,000. Director: H. H. Wardle, Stone House, Allesley, Coventry.

Blacker Forge & Hammer Company, Limited, Knowl Street, Stalybridge, Glos.—Capital £1,500. Directors: E. Wainwright and B. H. Wainwright.

British Malleable Iron Company, Limited, Blackheath, Worcester.—Capital £12,000. Directors: W. Harris, J. T. Tibbetts, Lucy Harris, T. Harris, J. Harris and Jesse Harris.

Charles Hahlo & Sons (Brazil), Limited, 16, Mill Street, Bradford.—Capital £25,000. Ironfounders, manufacturers of textile and other machinery. Directors: G. Moore, W. Ingham, H. V. Riley, F. Cooper and A. Bell.

Stockton Chemical Engineers & Riley Boilers, Limited.—Capital £5,000. To take on lease the machinery and premises known as The Perseverance Boiler Works, Stockton-on-Tees, recently in the occupation of Riley Bros. (Boilermakers), Limited. Directors: A. A. B. Walford, E. A. Parr-Dudley, J. Riley, G. W. Riley and R. D. West.

Company Reports

Barrow Hematite Steel Company, Limited.—Loss for 1933, £1,981; debit balance brought in, £10,158; debit carried forward, £12,139.

Crittall Manufacturing Company, Limited.—The dividend on the 7 per cent. cumulative preference shares, due June 1, is deferred. Six months' interest due on the 6 per cent. debenture stock will be paid as usual.

John Harper & Company, Limited.—Surplus to March 27, £21,735; available after preference dividends, £19,043; dividend of 10 per cent. on the ordinary shares, £11,673; further 3 per cent. on employees' preference shares, £183; to stock reserve, £2,187; carried forward, £5,000.

Ruston & Hornsby, Limited.—Profit on trading account, £53,224; debit balance brought in, £119,465; directors' fees, £1,439; interest on debentures and debenture stocks, £25,050; dividend from associated company (Ruston-Bucyrus, Limited), £18,600; debit balance carried forward, £74,130.

Contracts Open

Dorrington, June 18.—Supply and laying of 380 yds. of spun-iron water main, for the East Kesteven Rural District Council. Mr. E. H. Sills, Council Offices, Northgate, Sleaford.

India, June 19.—Locomotive cylinders and motion parts for superheater conversions, for the East Indian Railway. The Department of Overseas Trade. (Reference G.Y. 13,886.)

Cradley Heath, June 16.—Combination grates, bedroom mantel register, baths and portable boilers for 87 houses for the Rowley Regis Town Council. Mr. C. Buckley, town clerk, Council House, Old Hill, Staffs.

Personal

CAPTAIN JOHN IZON CHESSHIRE, of Shenstone Lodge, Lichfield, has been appointed a Deputy-Lieutenant for Staffordshire. Captain Chesshire is managing director of Messrs. Izons & Company, Limited, of Albion, West Bromwich, ironfounders and hollow-ware manufacturers.

Will

MASCALL, W. H., of Lansdowne Close, Worthing, late general manager, Nunnery Collieries £13,278

Obituary

MR. ROBERT L. CLARK, a well-known marine engineer, who for many years was on the technical staff of Messrs. Babcock & Wilcox, Limited, Renfrew, died recently.

MR. J. W. BARNSLEY, J.P., of Netherton, Dudley, principal and one of the founders of Messrs. John Barnsley & Sons, Limited, ironfounders, of Netherton, died last week, aged 79.

Applications to Register Trade Marks

The following list of applications to register trade marks has been taken from the "Trade Marks Journal":—

"CERALUMIN."—Aluminium alloys. J. Stone & Company, Limited, Deptford.

"LEPAZ."—Ley's Malleable Castings Company, Limited, Vulcan Iron Works, Derby.

"SIF-NOCKI."—Metal in rods for use in welding. L. J. Tibbenham, Gipping Works, Prentice Road, Stowmarket.

"CARFLECO."—Unwrought and partly-wrought metals. Cargo Fleet Iron Company, Limited, near Middlesbrough.

"PARSONS."—White metals. The Manganese Bronze & Brass Company, Limited, Caxton House, Westminster, London, S.W.1.

"MALSTEL."—Electric conduit fittings of ordinary metal. Fletcher, Houston & Company, Limited, Perry Street, Dudley Port, Tipton.

"LARUA" AND DESIGN.—An aluminium-copper alloy in cast ingots, billets, bars, wire and sheets. George Bernard Brook, "Edenmor," Kinlochleven, Argyll.

"MORODITE."—Preparations (not containing any metal) for use in making cores in foundries. Hedley Moorwood & Company, Limited, 32, Church Street, Sheffield.

French Ironmasters' Association

At the annual general meeting of the Comité des Forges de France, held on May 17, M. Desportes de la Fosse, the secretary-general, presented his annual report reviewing conditions in 1933 in the iron and steel industries of France and the principal other countries. He pointed out that 1933 was for the French iron and steel industry a year of unfulfilled hopes, a period of marked improvement in the first six months being followed by a decline in the second half of the year. The monthly output of pig-iron rose from 488,000 tons in January to 570,000 tons in July, and again declined to 522,000 tons in December; similarly, steel output increased from 504,000 tons in January to 585,000 tons in June, and then again fell to 498,000 tons in December. Yet pig-iron output for the year, at 6,327,000 tons, was 790,000 tons, or 14 per cent. more than that in 1932, the 1933 figure being, however, only 62 per cent. of the 1929 output, or 70 per cent. of the 1913 figure. Steel output at 6,525,000 tons was 885,000 tons, or 16 per cent. higher than in 1932, *i.e.*, 67 per cent. of the 1929 output and 7 per cent. above the 1913 output.

XUM

Raw Material Markets

A steady tone persists in the iron and steel markets. Although new business has not been coming along quite as freely as was expected, the producing works have plenty of work on hand, and there are no fears of a relapse from the present state of activity. The improvement in conditions on the North-East Coast is indicated by the increase which took place last month in the clearances of pig-iron, manufactured iron and steel from the Tees. The April total, at 58,912 tons, was the highest for any month since April, 1931.

Pig-Iron

MIDDLESBROUGH.—The current output of Cleveland iron is all going into consumption, but the demand is such that heavy tonnages of Midlands iron are having to be railed into this area to meet the needs of local consumers. An increase in output is probable if the present demand continues. Fixed home prices are unchanged, and there is no likelihood of any immediate variation. No. 3 Cleveland G.M.B. is at 67s. 6d. delivered Middlesbrough, 69s. 6d. delivered North-East Coast, 67s. 3d. delivered Falkirk, and 70s. 3d. delivered Glasgow. For other grades there are the usual variations, namely, 2s. 6d. per ton premium for No. 1 foundry iron and 1s. discount for No. 4 foundry and No. 4 forge.

The East Coast hematite market is very firm. The output is at the highest level for years, but is nevertheless passing fully into consumption. In view of these circumstances, it is not surprising that the makers are unwilling to quote the low prices necessary for competition in overseas markets. The fixed minimum prices for No. 1 hematite range from 68s. per ton delivered Middlesbrough and 70s. delivered North-East Coast, to 79s. delivered Birmingham.

LANCASHIRE.—New buying of pig-iron in this area has not been very strong lately, but it is believed that more activity will be seen in the near future, as deliveries against existing contracts have been made at a satisfactory rate. There has been no change in prices. Staffordshire and Derbyshire brands of No. 3 foundry iron are quoted for delivery to users in Lancashire on the basis of 74s. per ton and Northamptonshire at 72s. 6d. Cleveland brands of No. 3 for delivery in Lancashire are also obtainable at 74s. per ton. Scottish foundry iron is on offer at about 83s., but sales in this district remain poor.

MIDLANDS.—Something of a buying movement has developed in connection with Midland brands of pig-iron, this being a period when many contracts run out. The light-castings manufacturers remain very busy, whilst conditions at the engineering works are reported to be improving. It is stated that deliveries of iron from the Midland furnaces during May were well up to previous months' levels. Business is taking place at the recently reaffirmed prices for Midland irons of 67s. 6d. per ton for Northants No. 3 and 71s. for Derbyshire, Staffordshire and Lincolnshire No. 3. These prices include delivery to Birmingham and Black Country stations and for large consumers are subject to a small graduated rebate. Low-phosphorus pig-iron is on offer between 81s. and 85s., and medium-phosphorus grade from 70s. to 80s., while for special work, such as Diesel engines and cylinders, where refined iron is used, the prices for suitable pig range from £5 15s. to £6 15s. per ton delivered this area.

SCOTLAND.—The demand for Scottish foundry iron remains very limited. Prices are unchanged at 70s. for No. 3, with 2s. 6d. extra for No. 1. The light-castings trade continues to consume large quantities of iron, and last month no less than 9,890 tons of Cleveland iron were shipped to Scotland, in spite of the fact that iron of a similar analysis is now being made locally. There is no change in prices of English irons for delivery here.

Coke

The foundry-coke market is very firm, and many consumers are hastening to make purchases, in view of the probability of an early rise in prices. Current quotations delivered Birmingham are as follow :— Best Durham coke, 36s. 6d. to 40s.; other grades, about 35s.; Scottish coke, 41s. to 42s.; Welsh coke, 37s. 6d. to 45s. per ton, according to analysis.

Steel

The markets have entered upon a period of rather quieter trading, and in most departments the volume of new business has declined since the end of May, states the official report of the London Iron and Steel Exchange. This is a seasonal movement, however, and there are signs in several directions that the usual recovery is not likely to be late this year. In practically all departments of the steel trade manufacturers have a heavy tonnage of orders in hand, which will keep them well employed for some time. In the semi-finished steel department the quietness is more noticeable; but this is partly due to a number of the more important consumers having covered their requirements well forward. Production is on a good scale, and although there has been an increase in the volume of business in Continental material it has not been sufficient to disturb the market. The demand for finished-steel materials has been less active of late, but there has been a good volume of inquiry and the orders on the makers' books amount to a satisfactory tonnage. Recently the export trade has shown signs of reviving, but the home demand is still the mainstay of the market.

Scrap

Scrap-iron quotations in the Cleveland area are unchanged at 52s. 6d. for heavy scrap, 55s. for machinery metal, and 47s. 6d. for light cast iron, per ton delivered. The foundry trade in the Midlands remains busy, and there is a consistent demand for cast-iron scrap in that area; quotations are unchanged. In South Wales, there is an improved call for heavy cast iron in large pieces and furnace sizes, which is firmer at 47s. 6d. to 48s. 6d. Better business is also being done in light cast-iron scrap, at 42s. 6d. to 44s., but there is little call for machinery metal at the current level of 50s. to 52s. 6d. per ton. The demand for scrap iron in Scotland is, generally speaking, not very strong. Current quotations are 53s. for ordinary cast-iron scrap and 56s. for machinery scrap.

Metals

Copper.—A slightly steadier tone has been observed in the copper market recently, and it is thought that there is a prospect of improved prices in the not far distant future, particularly in view of the improvement in the American situation. The "code" for the regulation of the United States copper industry appears to be working successfully now, and a rise of half a cent per lb. in the domestic price of the metal has already been effected. It is also stated that world copper stocks have continued to show small decreases since the beginning of the year. In these circumstances, the price of copper on the London market would probably be higher than it is, were it not for the recent dislocation of the European copper trade. Currency and other restrictions are still making trade with the Continent very difficult to transact.

Daily quotations :—

Cash.—Thursday, £32 13s. 9d. to £32 15s.; Friday, £32 10s. to £32 11s. 3d.; Monday, £32 18s. 9d. to £33; Tuesday, £32 13s. 9d. to £32 15s.; Wednesday, £32 16s. 3d. to £32 17s. 6d.

Three Months.—Thursday, £33 to £33 1s. 3d.; Friday, £32 16s. 3d. to £32 17s. 6d.; Monday, £33 5s. to £33 6s. 3d.; Tuesday, £33 to £33 1s. 3d.; Wednesday, £33 2s. 6d. to £33 3s. 9d.

Tin.—There continues to be a fair demand for tin in this country, but business across the Channel remains very limited. The outlook in the American tinplate industry has naturally been affected by the aggravated labour troubles, but, nevertheless, the latest reports indicate that the mills were still working at 75 per cent. of capacity.

Considerable criticism continues to be levelled at the "buffer pool" plan, which has now been officially accepted by the governments of the tin-producing countries. A special quota of 5 per cent. of the standard tonnages has been sanctioned as from June 1, to allow of the accumulation of the stock. The latter, which has been fixed at 8,282 tons, is to be completed by the end of the year, when it is to be used in an endeavour to rule out excessive fluctuations in market prices. The original object of the output-control scheme was to secure a reasonable balance between production and consumption, but the addition of the buffer-pool plan means that the main object becomes one of price-fixing. The effect of schemes of the latter nature upon the copper and other commodity markets has already been seen.

Market prices :—

Cash.—Thursday, £231 15s. to £232; Friday, £230 5s. to £230 10s.; Monday, £228 10s. to £228 15s.; Tuesday, £227 to £227 2s. 6d.; Wednesday, £226 5s. to £226 7s. 6d.

Three Months.—Thursday, £229 15s. to £230; Friday, £228 5s. to £228 10s.; Monday, £227 5s. to £227 10s.; Tuesday, £226 5s. to £226 7s. 6d.; Wednesday, £225 10s. to £225 12s. 6d.

Spelter.—Consumption in this country is reported to be satisfactorily maintained and buyers generally have taken a more active interest. The situation on the Continent is reported quiet, but prices have tended to harden a little, holders displaying rather more reserve, in the belief, no doubt, that with the improvement in the statistical position, prices should move to a higher level, report Messrs. Rudolf Wolff.

Day-by-day prices :—

Ordinary.—Thursday, £14 17s. 6d.; Friday, £14 17s. 6d.; Monday, £14 16s. 3d.; Tuesday, £14 15s.; Wednesday, £14 10s.

Lead.—The demand for lead in this country has been irregular, but quite good from some directions. There has been some shortage of prompt supplies of Empire metal.

Market fluctuations :—

Soft Foreign (Prompt).—Thursday, £11 3s. 9d.; Friday, £11 2s. 6d.; Monday, £10 18s. 9d.; Tuesday, £11 1s. 3d.; Wednesday, £10 18s. 9d.

Fifty-ton Electric Furnace

According to a recent issue of "Heat Treating and Forging," an electric-arc furnace of 50 tons capacity, and operated from a 10,000-k.v.a. transformer, provides a continuous output of about 15 to 20 tons per hr. of high-grade electric steel, produced entirely from a scrap charge.

CAST IRON FLANGED PIPES
2 in.–12 in. & CONNECTIONS. to 24 in. dia.
WE HAVE FIFTY-TWO YEARS OF ACCUMULATED EXPERIENCE AND METAL PATTERNS.
JAMES & RONALD RITCHIE, LTD.,
Telephone : 3852 (2 Lines). MIDDLESBROUGH. Telegrams : "Ritchie, Middlesbrough."

WM. CUMMING & CO. LTD.

The Leading Manufacturers!
The Oldest Established!!
The Most Reliable!!!

Ironfounders' Facings Manufacturers and General Foundry Furnishers,

Kelvinvale Mills, Maryhill, GLASGOW

Branches at Falkirk, Chesterfield, Deepfields and Middlesbrough

SUPERFINE COAL DUST

SUPERLATIVELY REGULAR IN GRIST.
SUPERIOR IN QUALITY.
SEVEN GRISTS STANDARDISED.
ONE QUALITY OF COAL THROUGHOUT.

INGOT MOULD BLACKING

THE BEST ON THE MARKET.
MANUFACTURED BY THE NEW PROCESS.

BRITISH PLUMBAGOS

AT LOW PRICES.
IMPORTED DIRECT.
NO CONTINENTAL ADULTERATION.

CUMMING FURNACE

USERS OF THE NEW "CUMMING" FURNACE ARE INCREASING WEEK BY WEEK.

CORECOMPOUNDS, PARTINGS, CUMMINGSTONE, REQUISITES, BLACKINGS for every PURPOSE

ALL OUR OWN MAKE

RAW MATERIALS—PRICE LIST

(Wednesday, June 13, 1934)

COPPER

	£	s.	d.
Standard cash	32	16	3
Three months	33	2	6
Electrolytic	36	0	0
Tough	34	10	0
Best selected	35	0	0
Sheets	62	0	0
India	45	0	0
Wire bars	36	5	0
Ingot bars	36	5	0
H.C. wire rods	38	15	0
Off. av. cash, May	32	14	$0\frac{9}{21}$
Do., 3 mths., May	32	19	$2\frac{5}{11}$
Do., Sttlmnt., May	32	13	$11\frac{5}{11}$
Do., Electro, May	35	19	$2\frac{5}{11}$
Do., B.S., May	35	16	$11\frac{1}{3}$
Do., wire bars, May	36	3	$3\frac{6}{11}$
Solid drawn tubes			10d.
Brazed tubes			10d.
Wire			$6\frac{1}{2}$d.

BRASS

Solid drawn tubes	9d.
Brazed tubes	11d.
Rods, drawn	$8\frac{1}{2}$d.
Rods, extd. or rlld.	$4\frac{1}{2}$d.
Sheets to 10 w.g.	$7\frac{1}{2}$d.
Wire	$7\frac{1}{2}$d.
Rolled metal	7d.
Yellow metal rods	$4\frac{1}{2}$d.
Do. 4 × 4 Squares	$5\frac{1}{4}$d.
Do. 4 × 3 Sheets	$5\frac{3}{4}$d.

TIN

	£	s.	d.
Standard cash	226	5	0
Three months	225	10	0
English	226	15	0
Bars	227	15	0
Straits (nom.)	226	10	0
Australian (nom.)			—
Eastern	228	0	0
Banca (nom.)			—
Off. av. cash, May	234	7	$8\frac{1}{21}$
Do., 3 mths., May	231	1	$6\frac{9}{21}$
Do., Sttlmt., May	234	7	6

SPELTER

	£	s.	d.
Ordinary	14	10	0
Remelted	14	5	0
Hard	11	15	0
Electro 99.9	17	3	9
English	15	2	6
India	13	15	0
Zinc dust	17	0	0
Zinc ashes	3	5	0
Off. aver., May	14	16	$10\frac{1}{2}$
Aver. spot, May	14	14	$5\frac{3}{11}$

LEAD

	£	s.	d.
Soft foreign ppt.	10	18	9
Empire (nom.)	11	8	9
English	12	15	0
Off. average, May	11	3	$11\frac{1}{21}$
Average spot, May	11	1	$0\frac{3}{11}$

ALUMINIUM

Ingots	£100 to £105
Wire	1/1 to 1/9 lb.
Sheet and foil	1/2 to 2/9 lb.

ZINC SHEETS, &c.

	£	s.	d.
Zinc sheets, English	23	10	0
Do., V.M. ex whse.	22	15	0
Rods	28	15	0

ANTIMONY

	£	s.	d.		£	s.	d.
English	40	0	0	to	43	0	0
Chinese, ex-whse.					32	0	0
Crude					24	10	0

QUICKSILVER

Quicksilver	11	2	6	to	11	10	0

FERRO-ALLOYS AND STEEL-MAKING METALS

Ferro-silicon—	
25%	8 17 6
45/50%	13 0 0
75%	18 7 6
Ferro-vanadium—	
35 50%	12/8 lb. Va.
Ferro-molybdenum—	
70/75% carbon-free of Mo.	5/6 per lb.
Ferro-titanium—	
23/25% carbon-free	9d. lb.
Ferro-phosphorus, 20/25%	£14 10 0
Ferro-tungsten—	
80/85%	3/3 lb.
Tungsten metal powder—	
98/99%	3/6 lb.
Ferro-chrome—	
2/4% car.	29 15 0
4/6% car.	23 0 0
6/8% car.	21 12 6
8/10% car.	21 12 6
Ferro-chrome—	
Max. 2% car.	36 0 0
Max. 1% car.	38 15 0
Max. 0.70% car.	42 0 0
70%, carbon-free	10d. lb.
Nickel—99.5/100%	£200 to £205
"F" nickel shot	£180 0 0
Ferro-cobalt, 98/99%	5/3 lb.
Metallic chromium—	
96/98%	2/5 lb.
Ferro-manganese (net)—	
76/80% loose	£10 15 0 to £11 5 0
76/80% packed	£11 15 0 to £12 5 0
76/80% export	(nom.) £9 15 0
Metallic manganese—	
94/96% carbon-free	1/2 lb.

Per ton unless otherwise stated.

HIGH-SPEED TOOL STEEL

Finished bars, 14% tungsten	2s. 0d.
Finished bars, 18% tungsten	2s. 9d.

Per lb. net, d/d buyers' works.

Extras—

Rounds and squares, 3 in. and over	4d. lb.
Rounds and squares, under ½ in. to ¼ in.	3d. lb.
Do., under ¼ in. to $\frac{1}{16}$ in.	1/- lb.
Flats, ½ in. × ¼ in. to under 1 in. × ⅛ in.	3d. lb.
Do., under ½ in. × ¼ in.	1/- lb.
Bevels of approved sizes and sections	6d. lb.

Bars cut to length, 10% extra.

SCRAP

	£	s.	d.		£	s.	d.
South Wales—							
Heavy steel					2	15	0
Bundled steel and shrngs.					2	7	6
Mixed iron and steel					2	10	0
Heavy cast iron	2	7	6	to	2	8	6
Good machinery	2	10	0	to	2	12	6
Cleveland—							
Heavy steel					2	10	0
Steel turnings					1	17	6
Cast-iron borings					1	7	6
Heavy forge					2	10	0
W.I. piling scrap					2	5	0
Cast-iron scrap	2	12	6	to	2	15	0
Midlands—							
Light cast-iron scrap					2	7	6
Heavy wrought iron					3	0	0
Steel turnings, f.o.r.					1	13	0
Scotland—							
Heavy steel	2	10	0	to	2	11	0
Ordinary cast iron					2	13	0
Engineers' turnings					2	0	0
Cast-iron borings	1	18	6	to	2	0	0
Wrought-iron piling					2	11	3
Heavy machinery					2	16	0

London—Merchants' buying prices, delivered yard.

	£	s.	d.		£	s.	d.
Copper (clean)					26	0	0
Brass					19	0	0
Lead (less usual draft)					10	0	0
Tea lead					7	10	0
Zinc					9	10	0
New aluminium cuttings					69	0	0
Braziery copper					23	0	0
Gunmetal					24	10	0
Hollow pewter					150	0	0
Shaped black pewter					110	0	0

PIG-IRON

N.E. Coast (d/d Tees-side area)—	
Foundry No. 1	70/-
Foundry No. 3	67/6
,, at Falkirk	67/3
,, at Glasgow	70/3
Foundry No. 4	66/6
Forge No. 4	66/6
Hematite No. 1	68/-
Hematite M/Nos.	67/6
N.W. Coast—	
Hem. M/Nos. d/d Glas.	72/6
,, d/d Birm.	84/6
Malleable iron d/d Birm.	115/-
Midlands (d/d Birmingham dist.)—	
Staffs No. 4 forge	67/-
,, No. 3 fdry.	71/-
Northants forge	63/6
,, fdry. No. 3	67/6
,, fdry. No. 1	70/6
Derbyshire forge	67/-
,, fdry. No. 3	71/-
,, fdry. No. 1	74/-
Scotland—	
Foundry No. 1, f.o.t.	72/6
,, No. 3, f.o.t.	70/-
Hem. M/Nos. d/d	71/-
Sheffield (d/d district)—	
Derby forge	64/6
,, fdry. No. 3	68/6
Lincs forge	64/6
,, fdry. No. 3	68/6
E.C. hematite	80/6
W.C. hematite	83/6
Lancashire (d/d eq. Man.)—	
Derby fdry. No. 3	74/-
Staffs fdry. No. 3	74/-
Northants fdry. No. 3	72/6
Cleveland fdry. No. 3	74/-
Dalzell, No. 3 (special)	102/6 to 105/-
Glengarnock, No. 3	83/-
Clyde, No. 3	83/-
Monkland, No. 3	83/-
Summerlee, No. 3	83/-
Eglinton, No. 3	83/-
Gartsherrie, No. 3	83/-
Shotts, No. 3	83/-

FINISHED IRON AND STEEL

Usual district deliveries for iron; delivered consumer's station for steel.

	£	s.	d.		£	s.	d.
Iron—							
Bars (cr.)	9	12	6	to	9	15	0
Nut and bolt iron	7	10	0	to	8	0	0
Hoops	10	10	0	to	12	0	0
Marked bars (Staffs) f.o.t.					12	0	0
Gas strip	10	10	0	to	12	0	0
Bolts and nuts, ¾ in. × 4 in.					14	0	0
Steel—							
Plates, ship, etc.	8	15	0	to	8	17	6
Boiler plts.	8	2	6	to	8	10	0
Chequer plts.					10	7	6
Angles					8	7	6
Tees					9	7	6
Joists					8	15	0
Rounds and squares, 3 in. to 5½ in.					9	7	6
Rounds under 3 in. to ½ in. (Untested)					8	12	0
Flats—8 in. wide and over					8	12	6
,, under 8 in. and over 5 in.					8	17	6
Rails, heavy	8	5	0	to	8	10	0
Fishplates	12	5	0	to	12	10	0
Hoops (Staffs)					9	7	0
Black sheets, 24g. (4-t. lots)					10	10	0
Galv. cor. shts. (,,)					13	0	0
Galv. flat shts. (,,)					13	10	0
Galv. fencing wire, 8g. plain					14	10	0
Billets, soft					5	10	0
Billets, hard	6	17	6	to	7	2	6
Sheet bars	5	0	0	to	5	5	0
Tin bars					5	0	0

PHOSPHOR BRONZE

	Per lb. basis.
Strip	11d.
Sheet to 10 w.g.	12d.
Wire	12d.
Rods	11d.
Tubes	15d.
Castings	13d.

Delivery 3 cwt. free.
10% phos. cop. £30 above B.S.
15% phos. cop. £35 above B.S.
Phosphor tin (5%) £30 above price of English ingots.
C. CLIFFORD & SON, LIMITED.

NICKEL SILVER, &c.

	Per lb.
Ingots for raising	7d. to 1/1
Rolled—	
To 9 in. wide	1/1 to 1/7
To 12 in. wide	1/1½ to 1/7¼
To 15 in. wide	1/1½ to 1/7½
To 18 in. wide	1/2 to 1/8
To 21 in. wide	1/2½ to 1/8½
To 25 in. wide	1/3 to 1/9
Ingots for spoons and forks	7d. to 1/3½
Ingots rolled to spoon size	10d. to 1/6½
Wire round—	
to 10g.	1/4½ to 1/11½

with extras according to gauge.
Special 5ths quality turning rods in straight lengths, 1/3½ upwards.

AMERICAN IRON AND STEEL

At Pittsburgh unless otherwise stated.

	Dols.
No. 2 foundry, Phila.	20.26
No. 2 foundry, Valley	18.50
No. 2 foundry, Birm.	14.50
Basic, Valley	18.00
Bessemer	20.76
Malleable, Valley	18.50
Grey forge, Valley	17.50
Ferro-mang. 80%, seaboard	85.00
O.-h. rails, h'y, at mill	36.37½
Billets	29.00
Sheet bars	30.00
Wire rods	38.00
	Cents.
Iron bars, Phila.	1.94
Steel bars	1.90
Tank plates	1.85
Beams, etc.	1.85
Skelp, grooved steel	1.70
Steel hoops	2.10
Sheets, black, No. 24	2.65
Sheets, galv., No. 24	3.25
Wire nails	2.60
Plain wire	2.30
Barbed wire, galv.	3.00
Tinplates, 100-lb. box	$5.25

COKE (at ovens)

Welsh foundry	25/- to 30/-
,, furnace	20/-
Durham foundry	21/- to 25/-
,, furnace	17/6
Midlands, foundry	—
,, furnace	—

TINPLATES

f.o.b. Bristol Channel ports.

I.C. cokes	20×14 per box		17/3 to 17/6
,,	28×20 ,,		34/6 to 35/-
,,	20×10 ,,		24/9 to 25/-
,,	18⅞×14 ,,		18/- to 18.3
C.W.	20×14 ,,		15/6
,,	28×20 ,,		32/3 to 32/6
,,	20×10 ,,		22/- to 22/1½
,,	18⅞×14 ,,		15/6 to 15/7½

SWEDISH CHARCOAL IRON & STEEL

	£	s.	d.		£	s.	d.
Pig-iron	26	0	0	to	27	0	0
Bars-hammered, basis	£16	0	0	to	£16	10	0
Bars and nail-rods, rolled, basis	£15	15	0	to	£16	0	0
Blooms	£10	0	0	to	£12	0	0
Keg steel	£30	0	0	to	£31	0	0
Faggot steel	£18	0	0	to	£23	0	0
Bars and rods dead soft, st'l	£10	0	0	to	£12	0	0

All per English ton, f.o.b. Gothenburg.
[Subject to an exchange basis of Kr. 18.16 to £1.]

DAILY FLUCTUATIONS

Standard Copper (cash)

		£	s.	d.		
June	7 ..	32	13	9	inc.	5/-
„	8 ..	32	10	0	dec.	3/9
„	11 ..	32	18	9	inc.	8/9
„	12 ..	32	13	9	dec.	5/-
„	13 ..	32	16	3	inc.	2/6

Electrolytic Copper

		£	s.	d.		
June	7 ..	35	15	0	inc.	2/6
„	8 ..	35	10	0	dec.	5/-
„	11 ..	36	0	0	inc.	10/-
„	12 ..	36	0	0	No change	
„	13 ..	36	0	0	„	„

Standard Tin (cash)

		£	s.	d.		
June	7 ..	231	15	0	inc.	70/-
„	8 ..	230	5	0	dec.	30/-
„	11 ..	228	10	0	„	35/-
„	12 ..	227	0	0	„	30/-
„	13 ..	226	5	0	„	15/-

Tin (English ingots)

		£	s.	d.		
June	7 ..	232	5	0	inc.	70/-
„	8 ..	231	0	0	dec.	25/-
„	11 ..	229	0	0	„	40/-
„	12 ..	227	10	0	„	30/-
„	13 ..	226	15	0	„	15/-

Spelter (ordinary)

		£	s.	d.		
June	7 ..	14	17	6	inc.	3/9
„	8 ..	14	17	6	No change	
„	11 ..	14	16	3	dec.	1/3
„	12 ..	14	15	0	„	1/3
„	13 ..	14	10	0	„	5/-

Spelter (Electro, 99.9 per cent.)

		£	s.	d.		
June	7 ..	17	10	0	inc.	5/-
„	8 ..	17	10	0	No change	
„	11 ..	17	8	9	dec.	1/3
„	12 ..	17	8	9	No change	
„	13 ..	17	3	9	dec.	5/-

Zinc Sheets (English)

		£	s.	d.	
June	7 ..	23	10	0	No change
„	8 ..	23	10	0	„ „
„	11 ..	23	10	0	„ „
„	12 ..	23	10	0	„ „
„	13 ..	23	10	0	„ „

Lead (English)

		£	s.	d.	
June	7 ..	12	15	0	No change
„	8 ..	12	15	0	„ „
„	11 ..	12	15	0	„ „
„	12 ..	12	15	0	„ „
„	13 ..	12	15	0	„ „

AVERAGE MONTHLY PRICES OF STEEL BOILER PLATES IN ENGLAND

Year	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Yearly average
	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.
1897	6 10 0	6 10 0	6 10 0	6 7 6	6 2 6	6 2 6	6 5 0	6 0 0	6 0 0	6 0 0	6 7 6	6 10 0	6 5 5
1898	6 10 0	6 8 9	6 8 9	6 10 0	6 15 0	6 18 9	6 17 6	6 17 6	7 2 6	6 15 0	7 0 0	7 5 0	6 15 8½
1899	7 5 0	8 0 0	8 2 6	8 2 6	8 5 0	8 5 0	8 12 6	8 12 6	8 15 0	8 15 0	9 2 6	9 5 0	8 17 8½
1900	9 5 0	9 5 0	9 7 6	9 10 0	9 12 6	10 5 0	10 5 0	10 5 0	10 5 0	10 0 0	9 15 0	9 15 0	9 15 10
1901	9 5 0	9 5 0	8 15 0	8 10 0	8 10 0	7 10 0	7 15 0	7 15 0	7 15 0	7 15 0	7 15 0	7 15 0	8 3 11
1902	7 7 6	7 0 0	7 12 6	7 12 6	7 12 6	7 10 0	7 10 0	7 10 0	7 10 0	7 10 0	7 10 0	7 10 0	7 9 7
1903	7 10 0	7 10 0	7 15 0	7 5 0	7 5 0	7 5 0	7 5 0	7 0 0	7 0 0	7 0 0	7 0 0	6 17 6	7 3 11½
1904	6 12 6	6 15 0	7 0 0	7 0 0	7 0 0	7 0 0	7 0 0	7 0 0	7 0 0	7 0 0	7 0 0	7 0 0	6 18 11½
1905	6 17 6	6 17 6	6 17 6	6 17 6	6 17 6	6 17 6	6 17 6	6 17 6	6 10 0	7 5 0	8 0 0	8 0 0	7 1 3
1906	8 0 0	8 0 0	8 0 0	8 0 0	8 0 0	8 0 0	8 0 0	8 0 0	8 0 0	8 0 0	8 0 0	8 10 0	8 0 10
1907	8 10 0	8 10 0	8 10 0	8 10 0	8 10 0	8 10 0	8 10 0	8 10 0	8 10 0	8 10 0	8 0 0	8 0 0	8 3 4
1908	7 10 0	7 10 0	7 10 0	7 5 0	7 5 0	7 5 0	7 0 0	7 0 0	7 0 0	7 0 0	7 0 0	7 0 0	7 3 9
1909	7 0 0	7 0 0	7 0 0	7 0 0	7 0 0	6 15 0	6 15 0	6 15 0	7 0 0	7 0 0	7 0 0	7 0 0	6 18 9
1910	7 0 0	7 0 0	7 1 3	7 5 0	7 5 0	7 5 0	7 5 0	7 5 0	7 5 0	7 10 0	7 10 0	7 10 0	7 5 1
1911	7 10 0	7 10 0	7 10 0	7 10 0	7 10 0	7 10 0	7 10 0	7 10 0	7 10 0	7 10 0	7 10 0	7 14 0	7 10 4
1912	7 18 9	8 0 0	8 0 0	8 7 6	8 10 0	8 10 0	8 10 0	8 15 0	8 16 3	9 0 0	9 2 0	9 5 0	8 11 2½
1913	9 5 0	9 5 0	9 5 0	9 5 0	9 5 0	9 5 0	9 5 0	8 19 0	8 15 0	8 5 0	7 15 0	7 15 0	8 17 0
1914	7 15 0	7 15 0	7 15 0	7 13 9	7 10 6	7 5 0	7 0 0	8 0 0	8 2 6	8 5 0	8 5 0	8 5 0	7 15 11½
1915	8 14 0	9 10 0	9 17 6	10 10 0	10 10 0	11 0 0	11 0 0	11 0 0	11 0 0	11 4 0	12 0 0	13 0 0	10 15 5½
1916	13 0 0	13 0 0	13 0 0	12 15 0	12 10 0	12 10 0	12 10 0	12 10 0	12 10 0	12 10 0	12 10 0	12 10 0	12 12 11
1917	12 10 0	12 10 0	12 10 0	12 10 0	12 10 0	12 10 0	12 10 0	12 10 0	12 10 0	12 10 0	12 10 0	12 10 0	12 10 0
1918	12 10 0	12 10 0	12 10 0	12 10 0	12 10 0	12 10 0	12 10 0	12 10 0	12 10 0	12 10 0	12 10 0	12 10 0	12 10 0
1919	13 0 0	15 0 0	15 0 0	15 0 0	19 5 0	19 17 6	21 0 0	21 10 0	21 10 0	21 10 0	21 15 0	23 10 0	18 9 9
1920	26 0 0	28 0 0	28 5 0	28 10 0	29 5 0	30 0 0	30 0 0	30 0 0	30 10 0	31 0 0	31 0 0	31 0 0	29 9 2
1921	30 5 0	29 0 0	25 0 0	25 0 0	25 0 0	23 0 0	21 0 0	20 10 0	19 0 0	17 10 0	16 0 0	14 16 0	22 1 9
1922	14 10 0	14 10 0	14 10 0	14 10 0	14 10 0	13 1 8	13 10 0	12 15 0	12 10 0	12 10 0	12 10 0	12 6 0	13 10 9
1923	12 8 9	13 6 0	14 0 0	14 0 0	14 0 0	14 0 0	13 12 6	13 0 0	13 0 0	13 0 0	13 0 0	13 10 0	13 9 1½
1924	13 10 0	13 10 0	13 10 0	13 10 0	13 10 0	13 10 0	13 10 0	14 0 0	14 0 0	13 11 0	13 5 0	13 5 0	13 10 11
1925	13 5 0	13 5 0	13 5 0	13 1 0	12 15 0	12 15 0	12 15 0	12 15 0	12 7 6	11 14 0	11 10 0	11 10 0	12 11 5½
1926	11 10 0	11 10 0	11 10 0	11 5 0	11 5 0	11 5 0	11 5 0	11 5 0	11 5 0	11 5 0	11 5 0	11 5 0	11 6 3
1927	11 5 0	11 5 0	11 5 0	11 5 0	11 2 6	11 0 0	11 0 0	11 0 0	10 16 0	10 10 0	10 10 0	10 10 0	10 19 0½
1928	10 10 0	10 10 0	10 10 0	10 10 0	10 10 0	10 10 0	10 10 0	10 10 0	10 10 0	10 10 0	10 10 0	10 10 0	10 10 0
1929	10 10 0	10 10 0	10 10 0	10 10 0	10 10 0	10 10 0	10 10 0	10 5 0	10 1 3	10 1 3	10 1 3	10 1 7	10 6 8½
1930	10 2 9	10 3 5½	10 3 9	10 3 9	10 3 6	10 2 6	10 2 6	10 2 2½	9 19 6	9 16 3	9 16 3	10 1 6½
1931	9 15 0	9 15 0	9 15 0	9 10 11	9 6 9	9 5 0	9 7 0	9 7 9½	9 8 9	9 5 9	9 5 6	9 9 6	9 9 4
1932	9 5 0	9 2 6	8 18 6	8 17 6	8 16 6½	8 16 3	8 16 3	8 16 3	8 16 3	8 16 3	8 16 3	8 16 3	8 17 10
1933	8 10 0	8 10 0	8 10 0	8 8 9	8 5 0	8 5 0	8 5 0	8 5 0	8 5 0	8 5 0	8 6 0	8 7 6	8 6 10½
1934	8 8 1½	8 10 7½	8 16 6	8 17 6	8 6 3	—	—	—	—	—	—	—	—

WILLIAM JACKS & COMPANY,
WINCHESTER HOUSE, OLD BROAD ST., LONDON, E.C.2.

CLARENCE CHAMBERS, 39, CORPORATION STREET, BIRMINGHAM.
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All grades FOUNDRY, HEMATITE, BASIC, SPECIALS, &c.

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ZETLAND ROAD, MIDDLESBROUGH.

XUM

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(A remittance should accompany instructions.)

SITUATIONS VACANT AND WANTED

LONDON Founders require to appoint Brass-foundry Foreman who must have considerable experience in castings for high-pressure air, steam and hydraulic work to British and foreign Government specification.—Apply, stating age, salary required, fullest particulars of experience and previous positions held, to BOX 782, Offices of THE FOUNDRY TRADE JOURNAL, 49, Wellington Street, Strand, London, W.C.2.

WANTED, Foundry Foreman in Midlands with experience in light castings, rain-water goods, ranges, grates, etc.; must be capable of handling 3/400 men, and have a special knowledge of the best cupola practice and able to get results. Good wages will be paid to a suitable man. Age not over 35. Replies must state fully experience and wages. Information will be treated in strict confidence. —BOX 776, Offices of THE FOUNDRY TRADE JOURNAL, 49, Wellington Street, Strand, London, W.C.2.

EMPLOYMENT REGISTER.

Conducted by the Institute of British Foundrymen by courtesy of the proprietors of THE FOUNDRY TRADE JOURNAL.

Correspondence should be addressed to the General Secretary, Institute of British Foundrymen, St. John Street Chambers, Deansgate, Manchester, from whom full particulars can be obtained of this service.

Any employer wishing to communicate with a candidate should write to the General Secretary, quoting identification number.

EXPERIENCED Foundry Foreman desires position. General engineering, jobbing, machine-moulding. Experienced in estimating, cupola practice, etc. (245)

YOUNG Foundry Foreman in charge of grey-iron, non-ferrous, malleable foundry, desires change. Willing to go abroad. (246)

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OLD-ESTABLISHED Ironfoundry for Sale owing to death; going concern, well connected, full up with orders; competent staff, good buildings; freehold, 1¼ acres.—Box 770, Offices of THE FOUNDRY TRADE JOURNAL, 49, Wellington Street, Strand, London, W.C.2.

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with L.M. & S. and L. & N.E. Rlys.

WELL-BUILT & COMMODIOUS OFFICES

Will Sell whole or in lots to suit customers or Let on favourable terms. Unique opportunity for Manufacturers.

Apply—

THOS. W. WARD, LTD.,

ALBION WORKS, SHEFFIELD

MACHINERY

ONE genuine Tabor Roll-over Shockless Jolt-ram MOULDING MACHINE to take 30-in. by 40-in. boxes; practically new; can be seen working. Price £120.

One Roll-over Shockless Tabor JOLTING MACHINE to take 60 in. x 48 in.; can be seen working. Price £160.

A. HAMMOND, 14, Australia Road, Slough.

SAND-BLAST PLANTS AND AIR COMPRESSORS

(Tilghman's).

We have in stock :—

11 NEW SAND-BLAST PLANTS.
14 Re-conditioned Sand-blast Plants.
90 NEW AIR COMPRESSORS.
15 Re-conditioned Air Compressors.
All sizes—all pressures.

Sand-blasting and Metal-spraying for all Trades.

R. J. RICHARDSON & SONS, LTD.,
COMMERCIAL STREET, BIRMINGHAM, 1.

SANDBLAST PLANTS

Room, Rotary Barrel and Cabinet Types complete; 12 in stock.

SAND PLANT

Sand Mills, 6-ft., 5-ft. and 4-ft. 6-in. dia. Pans.

Rotoil "Senior" Oil Core Sand Mixer.

Pneulec Sand Drying Plant, output 1 ton per hour.

Brearley Type Disintegrators.

MOULDING MACHINES

Hand and Pneumatic Types.

Also

Six Rowlands Double-ended Grinders for 24-in. dia. x 2-in. wheels.

Electrical and Belt-driven Blowers and Exhaust Fans, Ladles, etc., etc.

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All sizes for high and low pressures.

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5-kw. PETROL PARAFFIN LIGHTING SET, 10 b.h.p., 750 r.p.m.

350 cub. ft. 3-cyl. Belt-dr. AIR COMPRESSOR.

"Weir" General Service PUMP, 10½" dia. cyl., 18" str.

VERT. COCHRAN BOILER, 14' x 7', 100 lbs. w.p.

Write for "Albion" Catalogue.

'Grams: "Forward." 'Phone: 23001 (10 lines).

ALBION WORKS, SHEFFIELD.

MISCELLANEOUS

FLUIDITY TESTS as described in THE FOUNDRY TRADE JOURNAL, February 1, 1934. Patterns of the above in aluminium can be supplied for 35s. per set. Post free. We can also supply Patterns for all branches of the engineering trade, in hard or soft woods. Send us your inquiries.—FURMSTON & LAWLOR, Patternmakers, Letchworth, Herts.

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CORE BOXES, dowelled and varnished, ready for use, made to order in all lengths and variety on shortest notice. HARDWOOD MALLETS also a speciality.—WILLIAM OLSEN, LIMITED, Cogan Street, Hull.

MISCELLANEOUS—*Continued*

'Phone: 287 SLOUGH

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12' × 9' Tilghman sandblast room, built of cast iron plates, complete with 400 cu. ft. Tilghman air compressor and all accessories **£290 Nett.**

T.B. 1 Tilghman sandblast barrel plant, complete. CHEAP.

T.B. 3 Tilghman sandblast barrel plant, double-jet, complete. CHEAP.

6' "Jackman" rotary sandblast table. CHEAP seen working.

SAND PLANT

Herbert "Whizzer" type disintegrator, No. 1 **£30**
Pneumatic riddle, by Macdonald **£8**
Large "Baillott" sand preparing plant CHEAP.

BUY FROM ME AND SAVE MONEY!

ALEX. HAMMOND, *Foundry Machinery Merchant,*
14, AUSTRALIA ROAD, SLOUGH

PETER—WITH ONE EXCEPTION

With one exception Peter is an ordinary little fellow. Chubby, likeable, just five-and-a-half, full of life and fun and on occasions—be it admitted—of naughtiness.

Just now Peter's rather important, for this is his first term at school, and he's grappling with the intricacies of "A B C" and "Twice-Two": difficult subjects to all men of five-and-a-half, but even more difficult in Peter's case because—bad luck—he's totally blind. That's his One Exception.

Peter learns reading, writing, and 'rithmetic through the medium of "Braille"—dull stuff compared with the coloured picture books of most five-and-a-halfs. However, he's a stout lad is Peter, and he's making great progress.

Would you like to know more about him? How, in spite of his "One Exception," he is being educated and, when older, technically trained and usefully employed.

There is a long waiting list of "Peters" throughout the British Isles, for whom training and accommodation must be provided in the immediate future.

Will you help with a donation or annual subscription? Any sum, large or small, will be gratefully received.

Here's a suggestion. Your eyesight is worth 3d. a year to you. Send Peter and his handicapped pals 3d. for every year you've had it. Now, please, in case it slips your memory. Good idea?

The Chairman,
SCHOOL FOR THE BLIND
(Founded 1838),
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